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# Sir Christopher Wren and the Wren Ideal in Modern Architecture

*By Albert C. Phelps*

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THE year 1923 marked the two hundredth anniversary of the death of Sir Christopher Wren. The Royal Institute of British Architects did not allow the occasion to pass unnoticed, having held a memorial meeting in February and later issued a splendid volume dealing with practically all phases of Wren's life and work.

While in London the past summer I was impressed with the fact that in a considerable number of new buildings there is evidence of a Wren revival, superficial at times, but occasionally indicating an appreciation of the aims and ideals of that great architect.

The life and works of Sir Christopher Wren are, I am sure, too well known to require more than a general review. Born in 1632, he lived to the age of ninety-one, remaining if not physically vigorous at least mentally alert to the end.

I suppose we all think of Wren as the designer of Saint Paul's Cathedral in London, perhaps forgetting the vast amount of other work accomplished by him.

Wren's precociousness as a child and brilliancy as a student have been emphasized by his biographers. His classical training, his scientific inclination and investigations, and the serenity of his character have been presented with force and distinctness.

Made Professor of Astronomy at Gresham College, London, at the age of twenty-five, and Savilian Professor of Astronomy at Oxford four years later, he had established a reputation for scholarship and scientific achievements equalled by few men of his time.

By many this period of his life is looked upon as a poor preparation for the profession that was to bring him still greater renown. In the light of his later accomplishments, however, we can now understand that, while formal æsthetic training was lacking, his ability to see his problems in a big broad way, to reason from cause to effect, and to subordinate detail—so obvious in his architectural works—was being perfected.

Let us consider the condition of architecture in England at the beginning of Wren's career. Throughout the latter half of the sixteenth century and the first half of the seventeenth classicism was slowly but surely gaining a foothold. Elizabethan and Jacobean builders grafted Italian details upon mediæval compositions, while gradually adapting the plans to new conditions. Up to the time Inigo Jones returned from a protracted period of study in Italy and entered the service of James I, no English designer understood classic composition, and even he did little to nationalize the style of Palladio that influenced him so profoundly.

Wren's first architectural essays were by no means surprisingly promising works. The Chapel of Pembroke Col-

*From a mezzotint engraving in the possession of Sir Reginald Blomfield, R.A., Litt.D.*

CHRISTOPHER WREN

Hampton Court. Wren's two fronts

lege, Cambridge, of which institution his uncle, Matthew Wren, had been president, and the Sheldonian Theatre, at Oxford, reveal a certain ingenuity, but no remarkable æsthetic gifts, and lack of experience in the handling of details is obvious.

In 1661 Wren was appointed assistant to Sir John Denham, surveyor-general of works, from whom he probably learned little. However, from the first he was required to produce designs for numerous and varied structures, and his inventive talents must have been taxed to the full.

In the summer of 1665, during the great London plague, Wren started for Paris, where he stayed till the following Christmas, "surveying the most esteemed fabrics in Paris and the country round," according to his own account, and taking every opportunity "to pry into trades and arts.' He asserts—what doubtless was true—that no better school of architecture was possible at the time. He came in contact with Bernini, whose design for the rebuilding of the Louvre he greatly admired. He also briefly records his impressions of the Palace of Versailles, the Château de Maisons, St. Germain, Fontainebleau, Chantilly, and other buildings that he visited and studied more or less carefully. He accumulated a large collection of architectural sketches and engravings and some of the notable architectural books of the time—both French and Italian.

Wren never went to Italy, and this six months' stay in France was his only period of architectural studentship. Returning to England, he entered at once upon a strenuous career, and until extreme old age had little leisure. His rapid progress in technical skill resulted from experiments in actual building.

Wren's connection with Saint Paul's Cathedral began as early as 1662, when he was consulted concerning repairs upon the mediæval building, one of the largest and most imposing Gothic churches in the United Kingdom. Inigo Jones had built a baroque façade and proposed other modifications, the execution of which was interrupted by the civil war. The building had become very unsafe and Wren proposed to build "a light thin shell of stone very geometrically made" as a roof, and to replace the central tower with "a dome or rotunda, and upon the cupola for outward ornament, a lantern with a spring top to rise proportionately." Evidently it was his intention to rebuild the cathedral along the lines begun by Jones.

Four drawings, dated 1666, and signed by Wren, are preserved in the library of All Souls' College, Oxford, representing a design with a central lantern surmounted by a huge open-work pineapple, sixty-eight feet high, "of monstrous and horrible design."

Evidently even at this time Wren was pondering the advantages of an open central area provided by such a feature as the octagon at Ely, over which diocese his uncle, Matthew Wren, had become bishop.

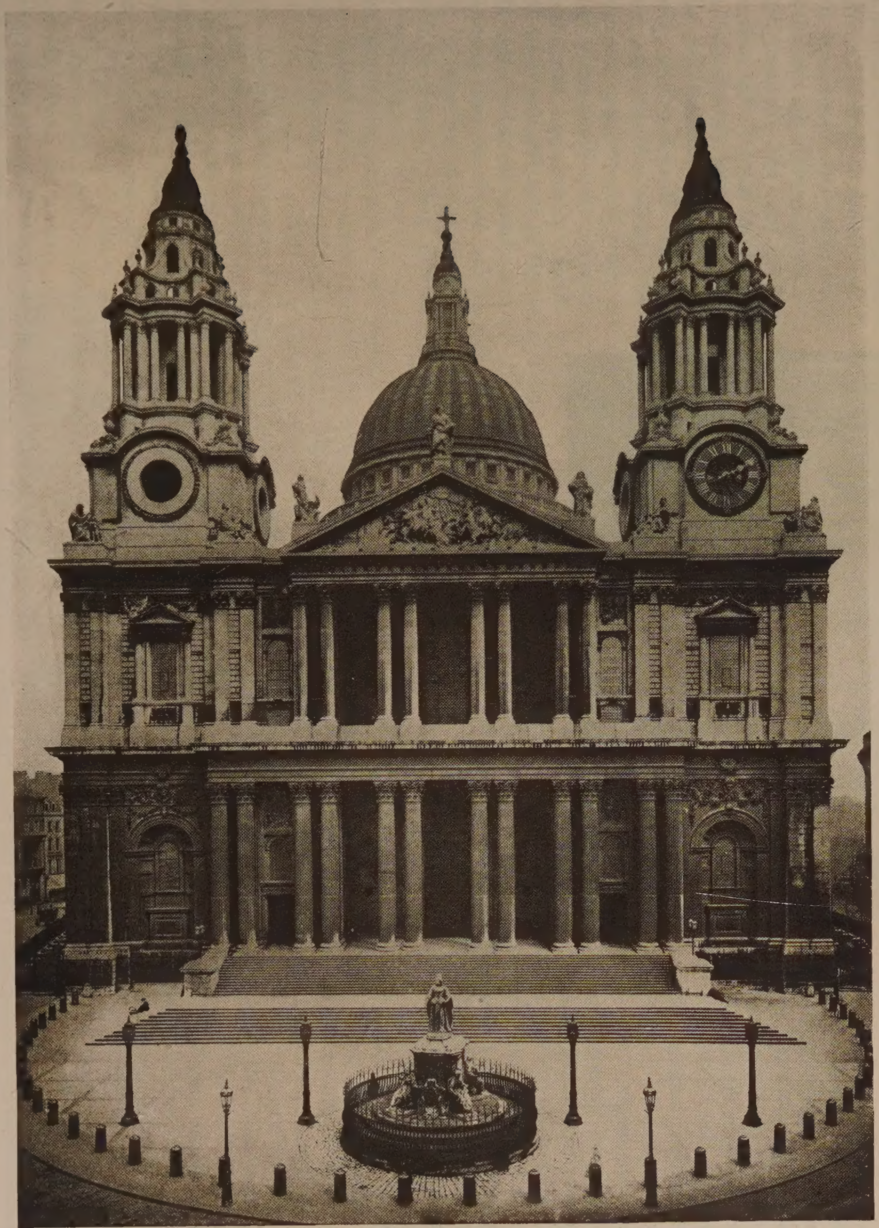
Wren's great opportunity came with the fire in London in 1666 that destroyed the entire central portion of the city. While a terrible disaster, it cleansed the city after the great plague and prepared the way for the rebuilding of Saint Paul's and over fifty parish churches. It also gave opportunity for replanning this section of the city, although an extremely ingenious and beautiful scheme prepared by Wren was never carried out. This was due to the necessity of immediate rebuilding, difficulties of compensation, and lack of sufficient funds.

The three chief features of the plan were: (1) a circular space at the summit of Fleet Street Hill, from which eight streets radiated in straight lines, connected by cross streets forming an octagon about the central area; (2) a triangular space in which was located Saint Paul's Cathedral; (3) the Royal Exchange surrounded by the Post-Office and other public buildings. This Wren intended to be the centre of the city, and from it were to radiate ten streets, each sixty feet wide. A broad quay extended along the river front and a semicircular space was arranged opposite London Bridge.

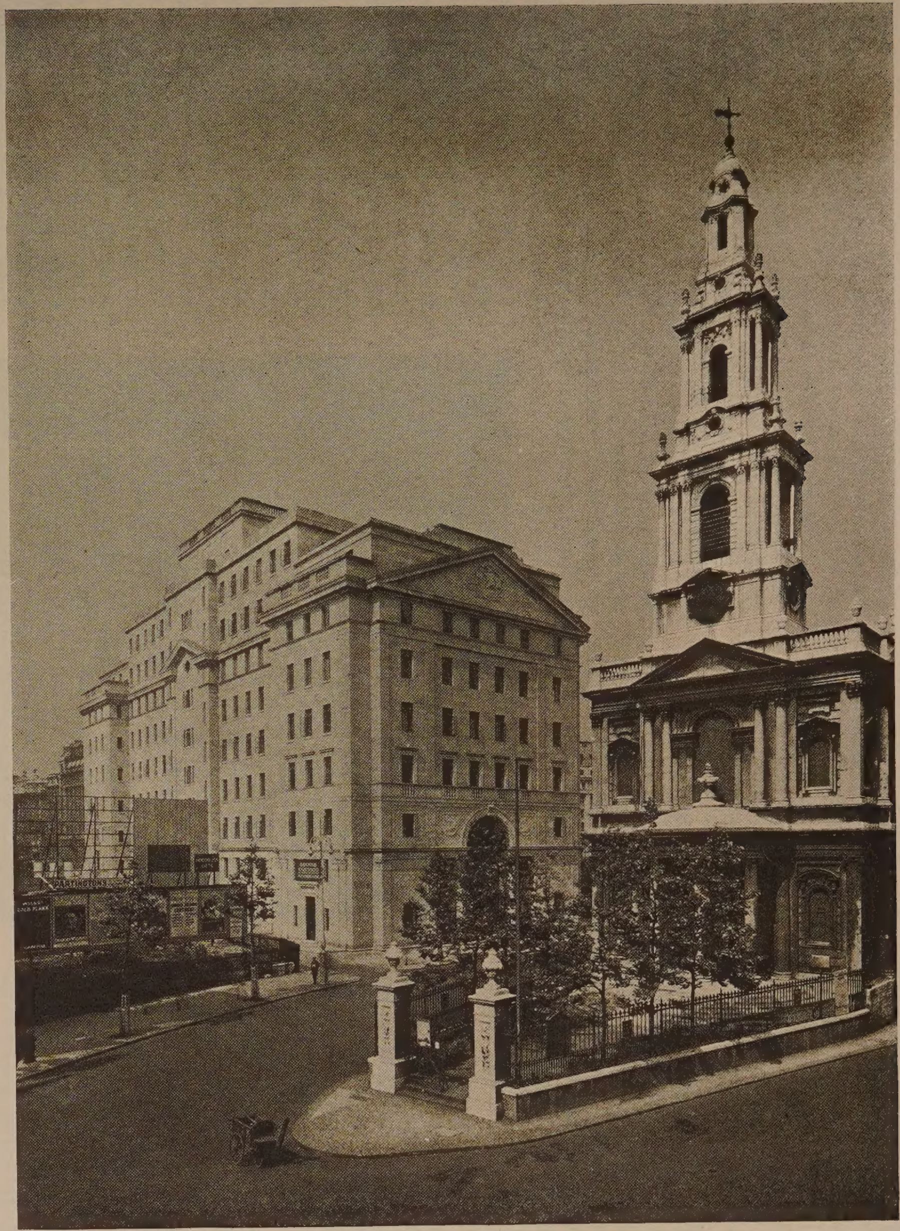
Wren succeeded ~~Sir John~~ Denham as surveyor-general—an office equivalent to that of royal architect—in 1668. He then turned his attention seriously to the rebuilding of the city churches and Saint Paul's. This work occupied him for the next thirty-eight years.

These parish churches, of which Wren built over fifty, are interesting and important as showing his development, aside from the merits of the buildings themselves. They offered difficult problems, the sites often being irregular, resources limited, and the requirements of Protestantism new. In the solution of these problems Wren showed great fertility of resource. He insisted that all must both see and hear in his churches. The interiors are usually bald and lacking in the mystery and play of light and shade of the mediæval churches. The strong feature of these churches is their reasonableness, the frank meeting of the conditions of the problem. The variety of plan and diversity of treatment are illustrated by such structures as Saint Lawrence

Trinity College Library, Cambridge. River front.



SAINT PAUL'S. Sir Christopher Wren, Architect.



BUSH HOUSE, LONDON.
Helmle & Corbett, Architects.

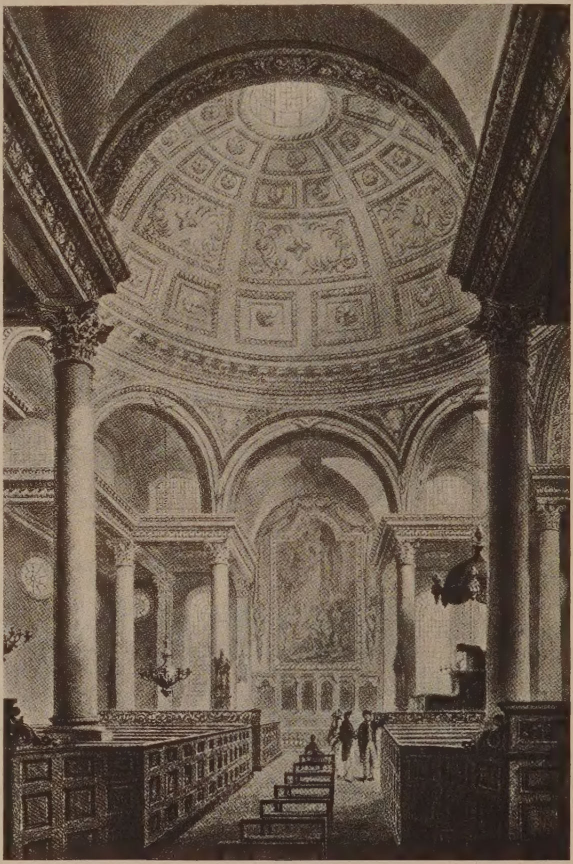
SAINT MARY-LE-STRAND.
James Gibbs, Architect.

(Jewry), Saint James (Piccadilly), Saint Benet (Fink), Saint Clement Danes, and Saint Stephen (Walbrook); while Saint Mary-le-Bow, Saint Vedast (Foster), Saint Stephen (Walbrook), and Saint Martin (Ludgate) reveal Wren's fertility of invention in tower and steeple design. Even though in minor details these steeples are not above criticism, in silhouette, and in the transition of one form to another, they show great mastery.

Wren prepared several designs for Saint Paul's Cathedral, London, of which but three are of historical importance: a rejected design, the drawings of which are preserved in All Souls' College, Oxford, and a model made by Wren is in the museum of Saint Paul's; the warrant design, very much inferior to the design mentioned; and the design as finally executed.

The rejected design was a favorite one with Wren and had some fine features. It was in plan a Greek cross, 300 by 400 feet, with quadrants connecting the arms of the cross. Over the central space was to be a dome 120 feet in diameter and 180 feet from the floor. The lighting of the dome is ingenious, being similar to that in Mansard's Dôme des Invalides in Paris, but earlier than its employment in the French building.

One sees in the warrant design a return to the traditional English cathedral plan of the Latin cross with the choir nearly as long as the nave. This was due to the conservatism of the clergy and possibly to the Catholic influence at court, whose supporters hoped for the restoration of the Romish faith and desired the cathedral to be well adapted to the ritual of the mother church. As the design was developed and the work progressed, the central area became contracted from a diameter of 120 feet to 108 feet and the western front was given greater emphasis; a vast improvement being made in the towers and particularly in their terminal treatment.



Saint Stephen, Walbrook.

In the construction of the dome Wren adhered to his original idea of a dome of two shells, but introduced the famous brick cone to support the stone lantern, estimated to weigh three hundred tons. The outer shell was constructed of timber with a lead covering. Great precautions were taken to provide adequate foundations and to buttress the dome and bind it together at the base with a great metal chain.

Mr. Somers Clark, former surveyor of the fabric of Saint Paul's, thinks he has discovered the function of the blank outer wall of the nave, choir, and transepts that masks the clearstory. Various English critics have explained this seemingly unfortunate feature as a "continuous pinnacle." However, Mr. Clark's explanation seems much more reasonable. This apparently useless wall is from eight to ten feet thick and evidently Wren must have had a reason for erecting such a massive structure. As explained by the diagram, these great walls, extending to a distance of 125 feet from the centre of the dome, serve as buttresses to the four great arches that support the dome. Apparently Wren exaggerated the danger of the thrust of such a structure, but the precautions were excessive rather than needless.

The central area was diminished somewhat in the executed work, but even in its contracted form it is the great feature of the plan, and the effectiveness of the dome makes this portion of the building remarkably impressive.

Doubts arise as to whether Wren ever could have completed the interior of Saint Paul's so that the decorative detail would have been at all commensurate with the spatial composition. It is true that Grinling Gibbons, in the choir-stalls and elsewhere, developed splendid woodwork, and Tijou, the French craftsman, produced some excellent iron grilles; however, while the interiors of Wren's lesser churches exhibit a progressive improvement, they hardly give promise of unlimited success in a larger undertaking.

There has been considerable speculation concerning the influence of executed structures upon Wren's works, and especially upon Saint Paul's. While Wren had not travelled extensively upon the Continent, he was personally familiar with a series of notable domical churches in Paris, viz.: Mazarin's Chapel of the Collège des Quatre Nations—now l'Institut de France; Ste.-Marie, the Chapel of the Sorbonne, and the Church of the Val de Grâce. He was also familiar — from drawings—with the classic Pantheon and the dome of Saint Peter's at Rome. The influence of these latter structures is obvious in his studies for Saint Paul's. Bramante's tempietto of S. Pietro in Montorio appears to have been followed somewhat freely in the silhouette of Saint Paul's dome, and the conical vault of the Baptistery at Pisa may have furnished the idea for the brick cone in Wren's building. Almost certainly Wren was from the first inspired by the octagon of Ely Cathedral, over which diocese his uncle, Matthew Wren, presided.

The first stone of Saint Paul's was laid with little ceremony in 1675; the last stone at the top of the lantern was laid by Wren's son in 1710. The church, however, had been opened for worship December 5, 1697.

As illustrating Wren's conscientiousness in his structural work, we are told that previous to its erection he had the lantern of Saint Paul's set up in the churchyard, every stone in its place, to avoid any possibility of a misfit. Also that when approaching his eightieth year he had himself hoisted in a basket once a week to the dome, so that he might personally inspect the progress of the work.

It is almost incomprehensible how Wren, with the meagre organization of his office, could have carried through the vast amount of work that we know he accomplished, disregarding all traditions that connect him with numerous works the authorship of which is doubtful. The following buildings give some suggestion of the variety and varied success of his undertakings.

Temple Bar and the Monument in London are the most notable of Wren's purely monumental works. The former, based perhaps somewhat vaguely upon the Bridge of Sighs at Venice, formed the official western entrance to the city, and the latter, a gigantic column, served to mark the spot where the great London fire started.

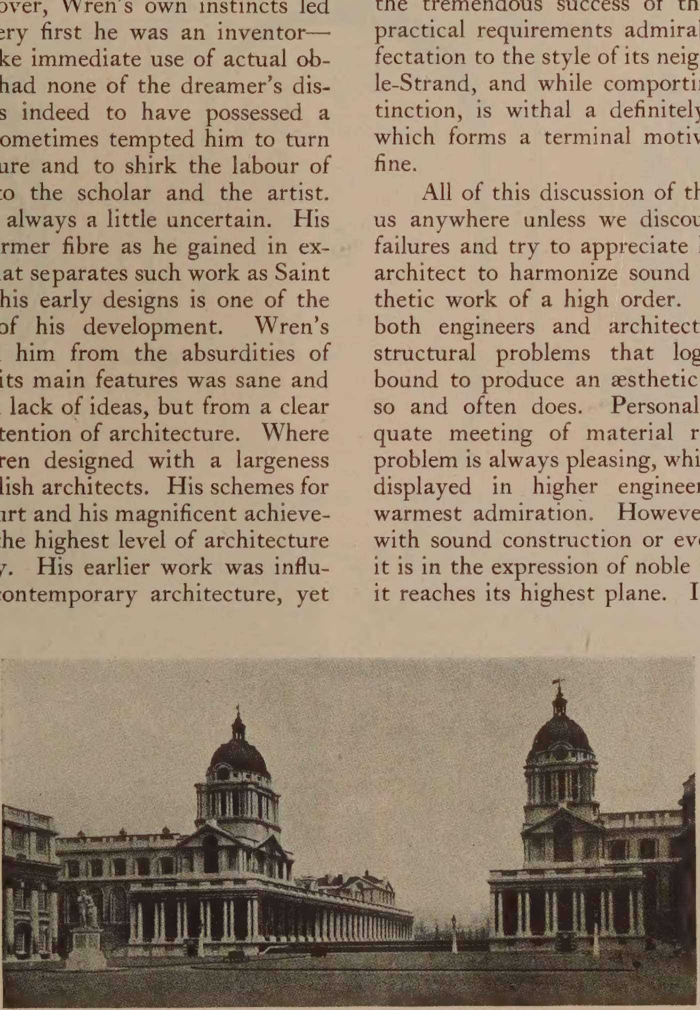
At the age of eighty-six, after having served as surveyor-general for forty-nine years, Wren was removed from office, owing largely, it is said, to court intrigues. He endured the humiliation with dignity, observing as he retired to his house at Hampton Court: "Now fortune bids me play the philosopher more readily."

Reginald Blomfield has given the following incisive analysis of Wren's gifts and attainments: "By unwearied labor and indomitable effort after a high ideal, Wren had grown to be an artist of first-rate genius, superior in skill and imagination to any architect of his time in Europe. He began almost as an amateur, rich in friends and opportunity, and buoyed up by the confidence of his brilliant career at Oxford and his own extraordinary inventiveness. As yet he was ignorant of the technique of his art, and the results were seen in artistic fiascoes, such as the Sheldonian. But Wren was a man who picked up knowledge on every hand, and he was rarely fortunate in his school, for he was allowed to learn his art on the scaffolding of his own buildings, and so gained a practical mastery of planning and construction never since equalled. Moreover, Wren's own instincts led him this way. From the very first he was an inventor—keen, alert, and quick to make immediate use of actual observation and discovery; he had none of the dreamer's disease of inactivity; he seems indeed to have possessed a fertility of invention which sometimes tempted him to turn out work before it was mature and to shirk the labour of fastidious finish inevitable to the scholar and the artist. For in fact Wren's taste was always a little uncertain. His taste, however, acquired a firmer fibre as he gained in experience; and the distance that separates such work as Saint Paul's and Greenwich from his early designs is one of the most remarkable features of his development. Wren's strong practical sense saved him from the absurdities of his successors. His work in its main features was sane and reasonable, and this not from lack of ideas, but from a clear insight into the limits and intention of architecture. Where he had the opportunity, Wren designed with a largeness of conception rare among English architects. His schemes for Winchester and Hampton Court and his magnificent achievements at Greenwich are at the highest level of architecture ever attained in this country. His earlier work was influenced in detail by French contemporary architecture, yet Wren maintained his individuality throughout, and one finds in his later manner a singularly direct and unaffected method of expression, free from pedantry and foolishness, and, above all, pre-eminently English in its sober power. The men who succeeded him were undoubtedly able, but they lacked the warm humanity of Wren. Their work was not spontaneous, and their inferiority appears in their conscious effort after academical correctness and their attempts to systematize architecture into a mere grammar of ornament. They sheltered their weakness under the genius of Inigo Jones, but in spite of their laborious imitation, Wren was the true successor of that great architect in all that makes architecture vital, in all the qualities that gave to the English Renaissance its sterling masculine quality."

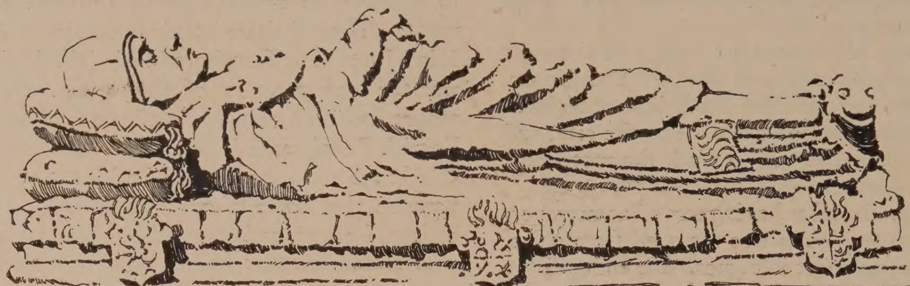
It seems to me that while Wren was not the infallible paragon that some of our English brethren would have us believe, he was, as Blomfield has indicated, a most remarkable man. Interest in his work in recent years has been manifested not alone in literary reviews and appreciations but in more or less direct imitation. And although most of us will agree that much of the modern English work lacks in logic of plan and consistency and harmony of detail, the resumption of the Jones-Wren tradition has had a wholesome effect, after the general misapplication of the mediæval styles in secular architecture. The new Criminal Courts, the Port of London Building, and even the London County Council Building approach much more nearly to an adequate solution of their several problems than the Parliament Houses, the Law Courts, or numerous other secular structures of the Gothic revival.

The British public seems to give a rather grudging approval to the new Bush House in London by Helmle & Corbett, of New York. After much speculation as to what sort of weird structure might be imposed upon them, it takes some time for the average Londoners to appreciate the tremendous success of the building, which meets the practical requirements admirably, adapts itself without affectation to the style of its neighbor, the fine old Saint Mary-le-Strand, and while comporting itself with a reserved distinction, is withal a definitely modern work. Its façade, which forms a terminal motive of Kingsway, is especially fine.

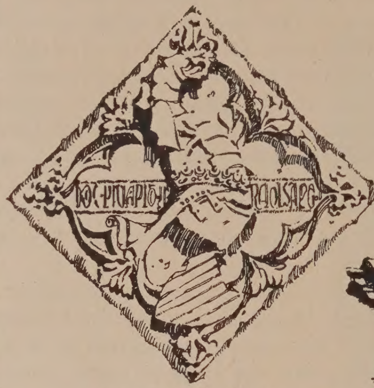
All of this discussion of the works of Wren hardly gets us anywhere unless we discount his partial successes and failures and try to appreciate his efforts as an engineer and architect to harmonize sound logical construction with æsthetic work of a high order. We are occasionally told by both engineers and architects especially concerned with structural problems that logical, sound construction is bound to produce an æsthetic effect. Certainly it may do so and often does. Personally, the straightforward adequate meeting of material requirements in a structural problem is always pleasing, while the cleverness, even genius, displayed in higher engineering structures arouses my warmest admiration. However, architecture does not stop with sound construction or even scientific construction; for it is in the expression of noble thoughts and aspirations that it reaches its highest plane. It is the duty of the architect to bring this expression into harmony with the best structural practice of the day, to utilize materials and stresses so as to emphasize a desired truth rather than to conceal by petty sham or grotesque adjustment the very forms and forces that give it being. This Wren strove to do, and if he faltered or failed, doubtless he felt it more keenly than either his caustic or kindly critics of the present time.



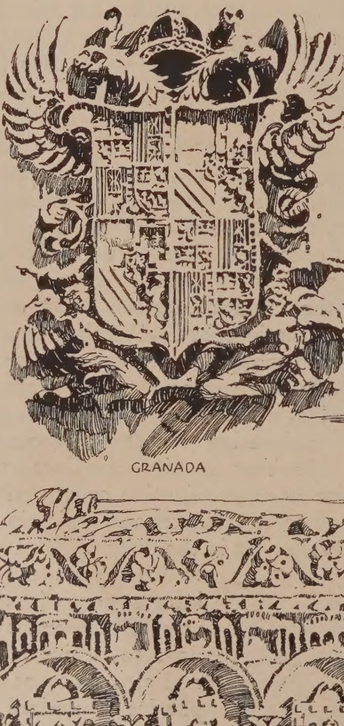
Greenwich Hospital and its two domes.



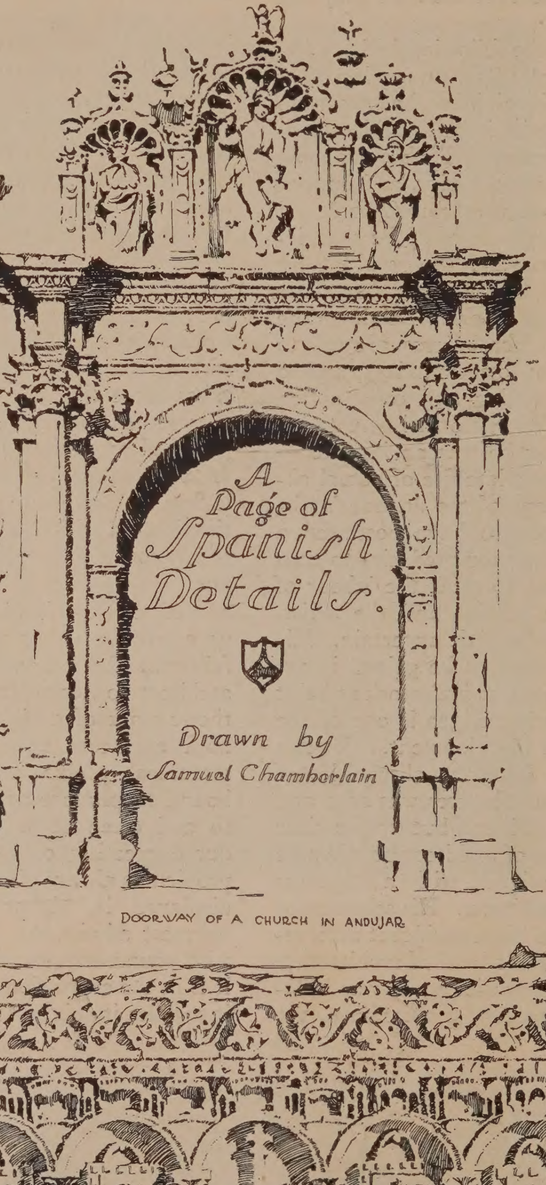
TOMBSTONE AT ARACENA



FROM THE MONASTARY OF POLBET



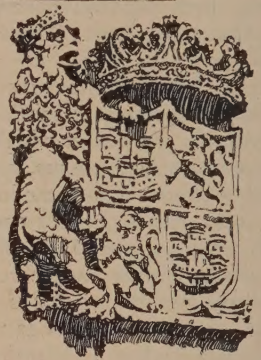
GRANADA



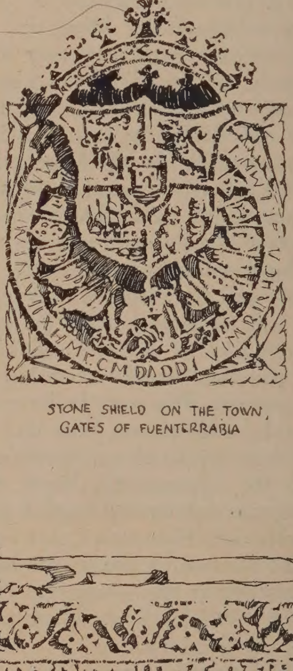
# A Page of Spanish Details.

Drawn by
Samuel Chamberlain

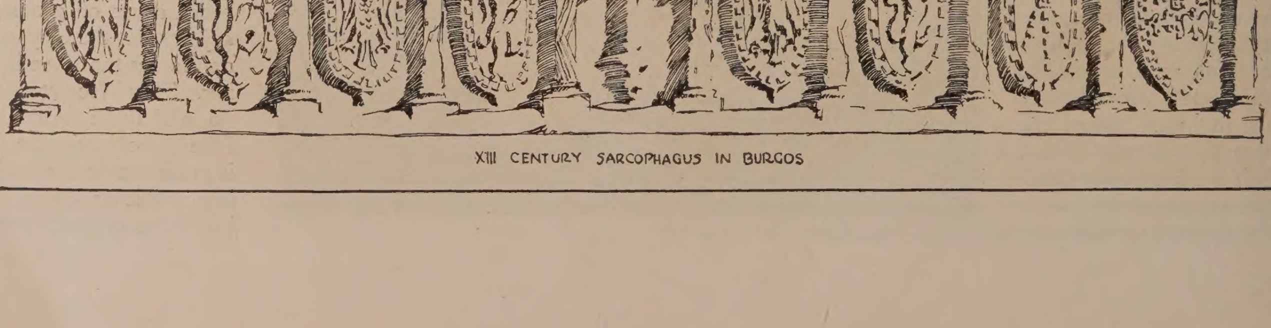
DOORWAY OF A CHURCH IN ANDUJAR



FROM THE CATHEDRAL AT BURGOS



STONE SHIELD ON THE TOWN, GATES OF FUENTERRABIA



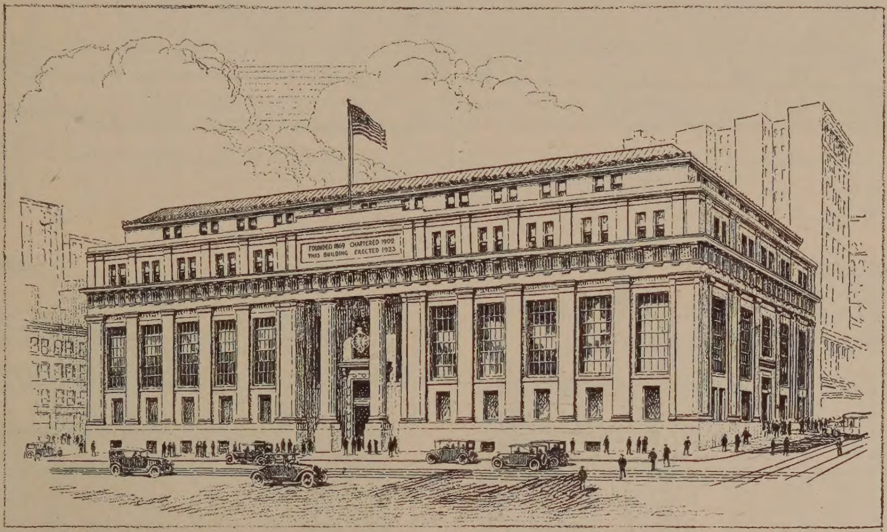
XIII CENTURY SARCOPHAGUS IN BURGOS

# The New Home of the Mellon National Bank, Pittsburgh, Pa.

Trowbridge & Livingston and E. P. Mellon, Architects

FROM an humble beginning, in 1869, to a world-known institution occupying what is probably the finest edifice in the world devoted exclusively to banking purposes, is the fifty-five-year record of the Mellon National Bank.

Through painstaking service and by wise and careful management the bank prospered, and in July, 1902, was incorporated as the Mellon National Bank.



The Mellon Bank.

The present head of the Mellon National Bank is Richard B. Mellon, a son of the founder, who succeeded his brother, Andrew W. Mellon, as president when the latter resigned that office to accept the portfolio of Secretary of the Treasury of the United States.

Since the incorporation of the bank deposits have grown from $8,000,000 to $110,934,418.06 on December 31, 1923, and its activities have been extended to cover every phase of modern banking service, world-wide in scope and applying to the whole range of commerce and industry.

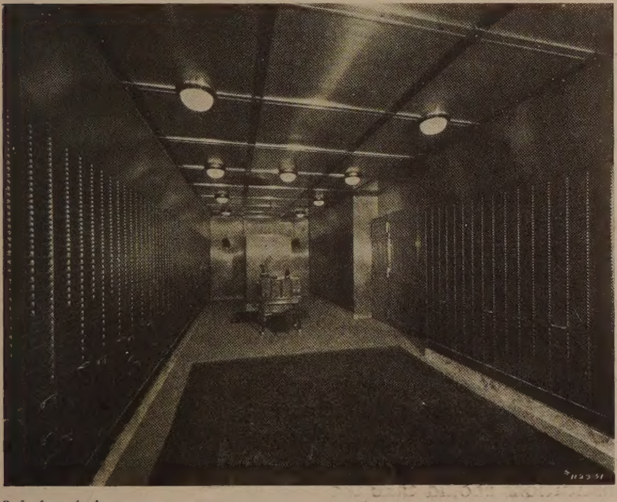
This remarkable growth necessitated enlarged facilities and has resulted in the magnificent new building which occupies the identical site selected by Thomas Mellon over half a century ago as the location of his banking enterprise.

The new Mellon National Bank Building is of distinctly classic architectural design, following the dignified, substantial Doric order. It extends the full block frontage of 232 feet along Smithfield Street and has a depth of 117 feet on both Fifth and Oliver Avenues. Of four-story construction, the building rises to a height of 116 feet above the sidewalk and has a basement and sub-basement beneath — offering 131,000 square feet of floor space, of which 27,144 square feet are on the ground floor.

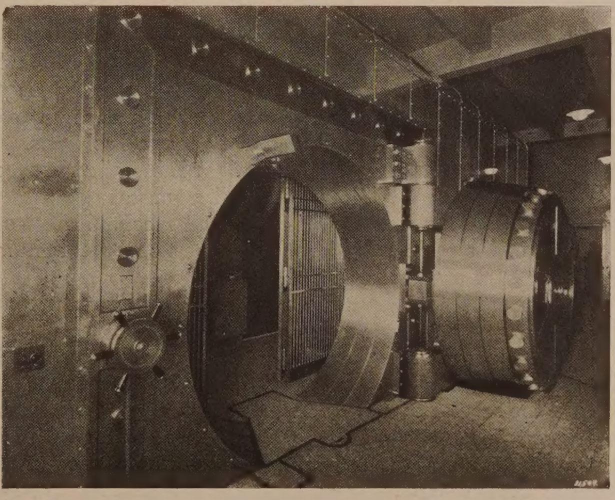
The main façade of strict Doric order, on Smithfield Street, is relieved by a series of pilasters between windows and by an entrance loggia forty feet wide in the centre, flanked by two massive granite pillars. Within the loggia are the great bronze doors of the bank.

The entrance on Oliver Avenue gives immediate access to the safe-deposit vault, with its 10,000 compartments of sizes to meet every requirement. This vault is equipped with the very latest scientific safety devices, and compartments are fitted with aluminum dust-proof boxes—the first aluminum safe-deposit boxes ever made. Boxes and compartments are similarly numbered to eliminate the possibility of error in replacing boxes in wrong compartments.

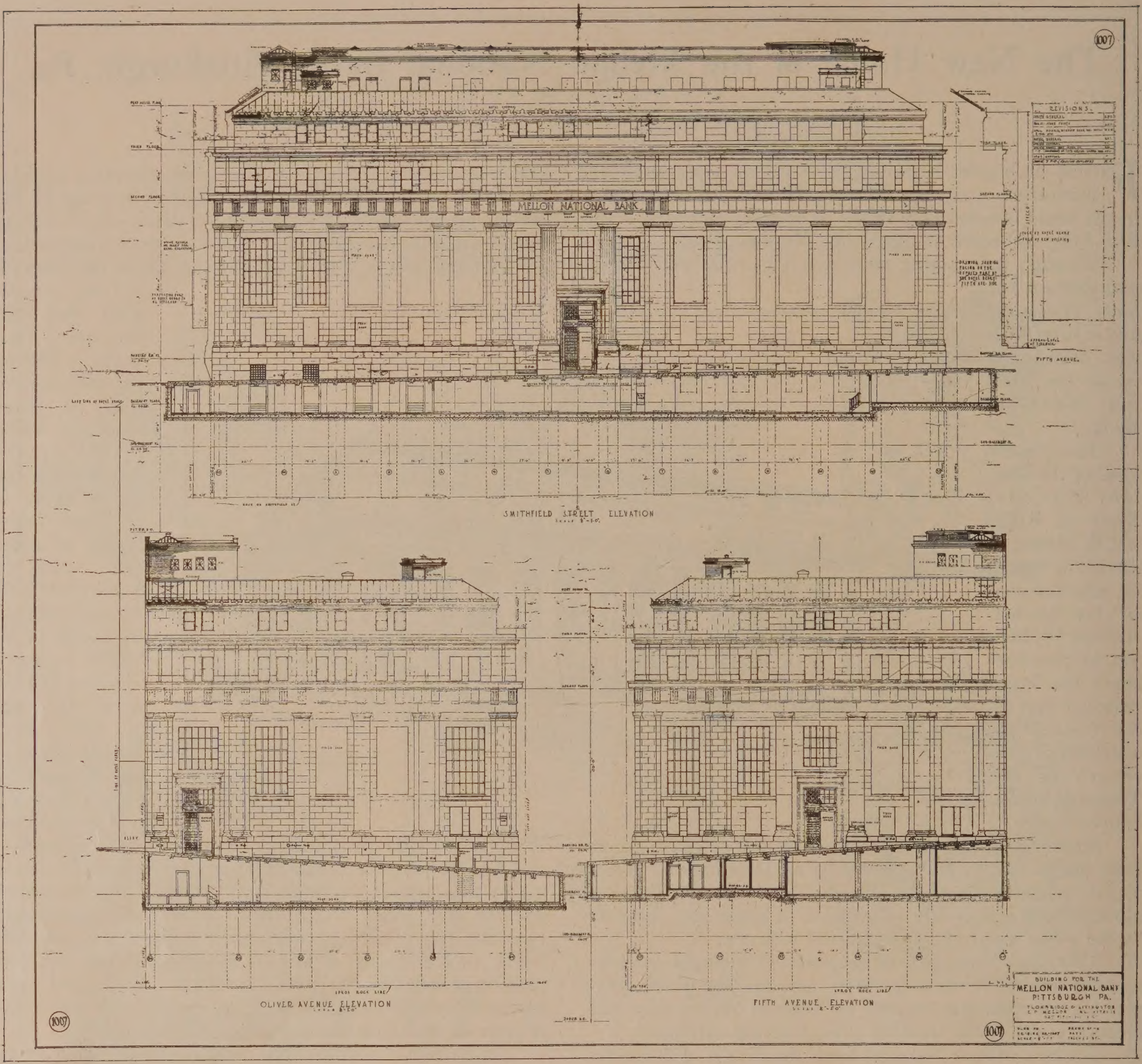
All entrances lead into the great central banking room,



Safe-deposit department.



Vault doors.



which is in the form of a basilica having large Ionic marble columns on all four sides. This banking room, with a height of sixty-two feet, stands clear and open for the entire length of the building. It is lighted by an immense skylight over the whole central space between the rows of columns. A Ventilighter system of scientific daylight is installed between the skylight and roof. This gives full advantage of natural lighting without glare, and is easily and mechanically controlled from the floor. Above the first floor the building forms a court with offices on all sides.

The exterior is of granite and bronze, while marble and bronze form the treatment inside.

The modern bank, large or small, is a centre of interest in the community, and naturally with the increasing demands for service and the need of saving time in the transaction of business, there has grown a demand for adequate room and a carefully arranged and systematized grouping of various departments.

A number of our architects have made a special study of the needs of modern banking and the buildings they have designed have embodied the latest and most convenient planning.

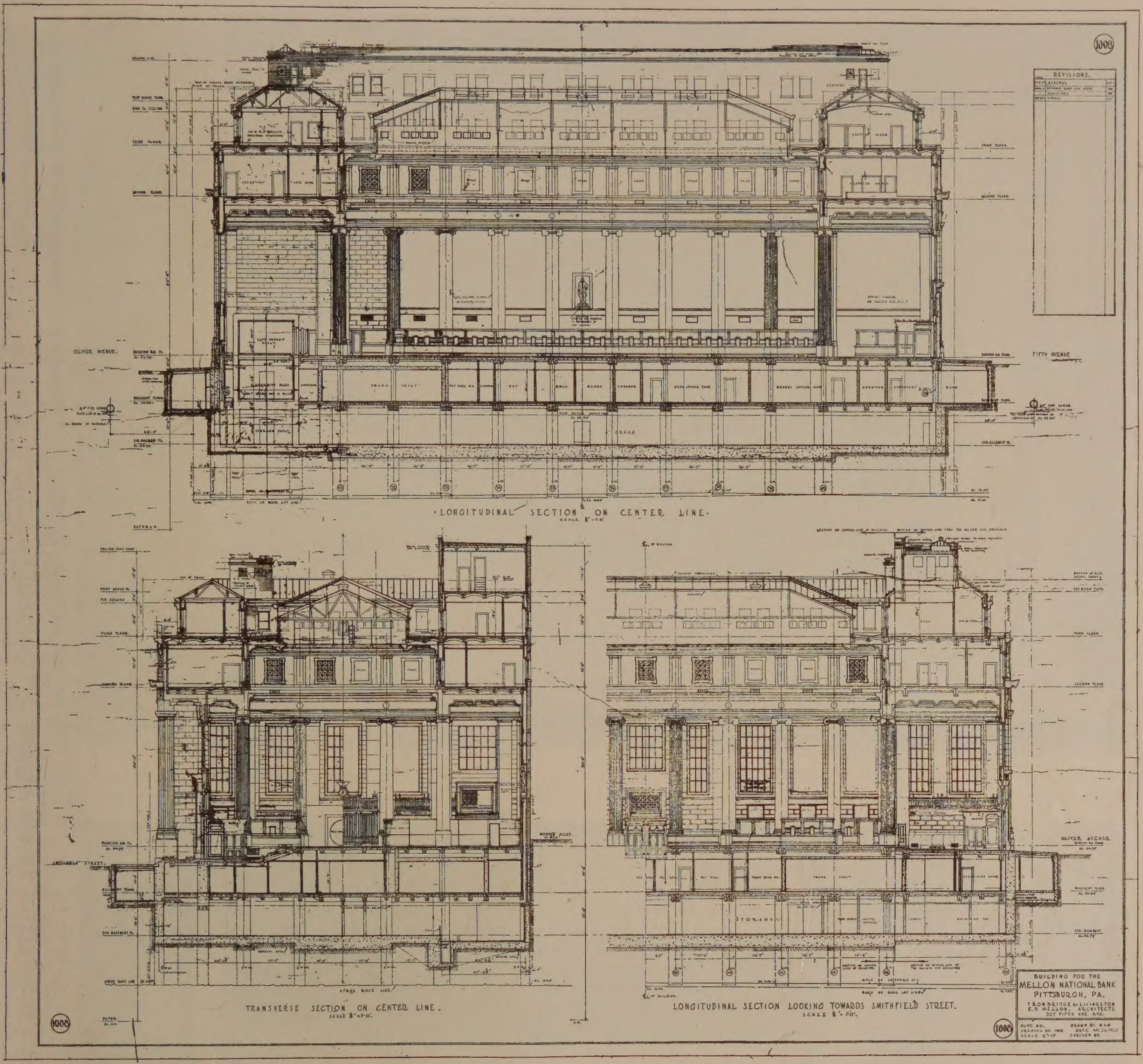
A handsome bank building is looked upon as a business asset, for it attracts attention by its very obvious evidences of prosperity.

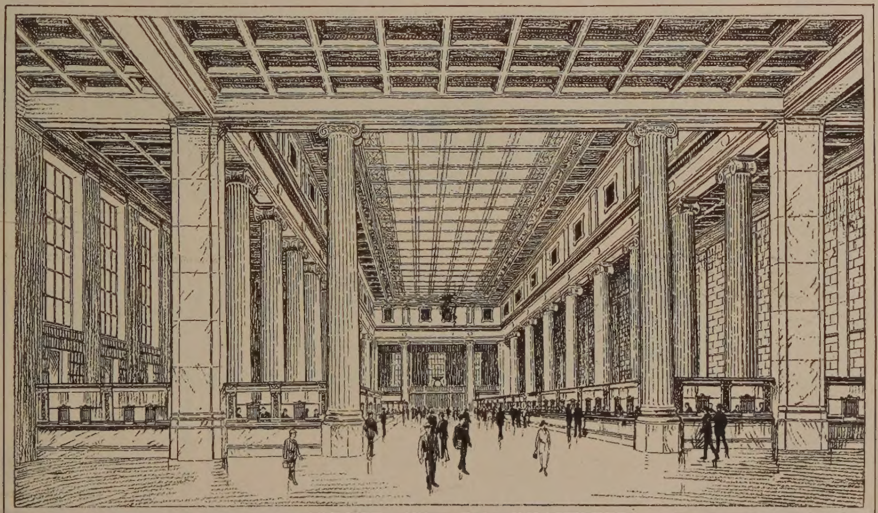
Fortunately most of the recent bank buildings may be looked upon as distinctive additions to our architecture.

In nearly every case the designers have thought of such buildings in traditional terms derived from the classic period, with the result that we have modified Greek temples devoted to the modern gods of the dollar.

Many of them are monumental in character and convey an impression of both dignity and luxury.

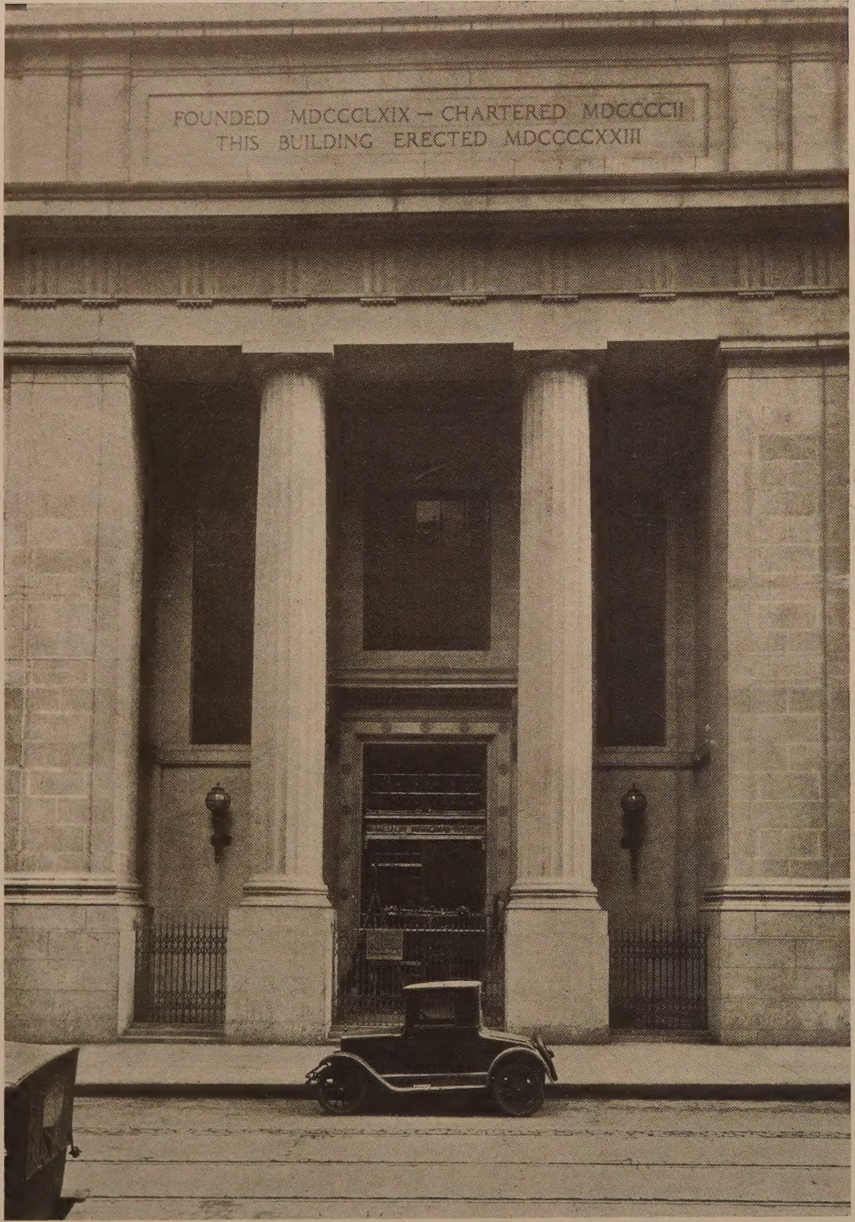
Such buildings as the beautiful Bowery Savings Bank in New York and the new Mellon National Bank in Pittsburgh are worthy of an architectural pilgrimage. Depositors in such institutions should take the time after they have transacted their business to study the details of the architecture.



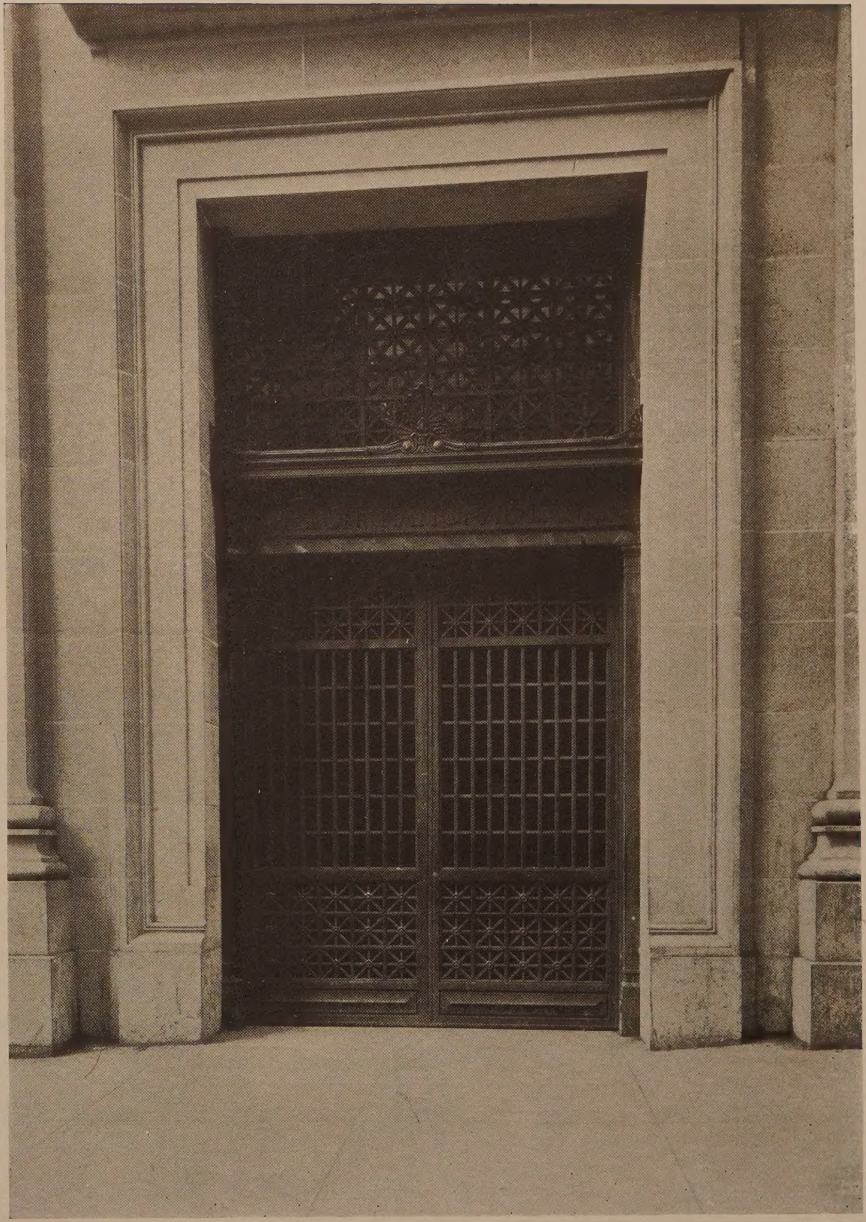


It would be time well spent, and if the interest cannot be measured in dollars and cents even so there might be a credit balance on the side of the book of knowledge that includes some things not to be measured in terms of cash.

There is a certain inspirational comeback to be derived from the mere spaciousness and elegance of these great rooms devoted to finance.


FOUNDED MDCCCLXIX – CHARTERED MDCCCCII
THIS BUILDING ERECTED MDCCCCXXIII

MAIN ENTRANCE, SMITHFIELD STREET.



FIFTH AVENUE ENTRANCE. Trowbridge & Livingston and E. P. Mellon, Architects.

THE MELLON NATIONAL BANK, PITTSBURGH, PA.

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* Reg. U. S. Pat. Office

# Editorial and Other Comment

### *Fifth Avenue Going Up!*

THE recent court decision allowing buildings of 150 feet in height on Fifth Avenue has already borne fruit in a rather surprising manner. The famous old Astor mansion, the scene of many notable social gatherings, is to be torn down to give place to a modern apartment building designed by Charles A. Platt for Mr. Vincent Astor, the owner; and the Fish house, another centre of social life in the past, is another included in the march of progress.

The fact is New York is growing too fast in a business way to permit land to be occupied by merely residential property, and even the very rich are giving up the homes they have held for years and moving into the more economical and in these days more convenient apartments. There are already apartments on Fifth Avenue, and with the passing of the Astor and the Fish houses we expect to see many more. In a few years this once great street of fashion and wealth may look like the west side of the Park, only it would be quite impossible to build anything as bad as the things that break the skyline along Eighth Avenue.

Thank heaven we have progressed considerably in the building of apartments, and as ugly and suggestive of the congestion of population as they are, many of them have the saving grace of fairly good design. There is no stopping the spirit of the times, and high taxes and the difficulty of conducting a private house are altering the faces of old streets of the rich all over the country.

There are some still alive and tottering around New York who can recall a Fifth Avenue practically free from business all the way from Washington Square to Fifty-ninth Street. It is only a question of time, and, we believe, a short time, when the Vanderbilt palace at Fifty-seventh Street will go the way of the Astor home.

Fifty-seventh Street, once a notable residential street, has become the centre of the art business, and as a street of fine shops it occupies a unique place in the upward growth of the city.

### *Missionary Work*

IN a recent number we referred to a book of designs and plans issued by the Community Art Association of Santa Barbara, Calif. The purpose of the book was to show how much better in every way even a simple, inexpensive house can be when designed by an architect. The people back of the book are idealists and beauty propagandists, and believe that the best service possible is to pass along the idea of beauty in common things. We are always preaching this doctrine, of course, not forgetting that architecture is a business, but we believe that attractive and well-designed architecture is the very best of business.

While this may apply especially to purely commercial buildings, we are inclined to think that a well-designed and harmonious residential district in a town or city is about the best business ever. The dear public wants to be beautified, but if left alone to their own devices and the influence of the carpenter and builder, the results are apt to be rather shocking to people of some architectural knowledge. There are already too many "bungalows" of a certain stock type that cost as much as a small house and spot up the landscape in a way to make the home-hunter of taste give up in despair.

### *Beating All Records*

ARCHITECTURE predicted that 1924 promised to establish a record in the building field, but our most sanguine figures didn't measure up to the actual conditions as shown in the first quarter of the new year.

In New York, according to the Dodge reports, there has been an outlay of $279,223,500 since January 1. The greater part of this has gone into residential building—single-family houses and apartments. Commercial and educational buildings have shown an increase, also, but the great bulk of work is in the building of places where people can live.

In the minds of many thoughtful investigators the question arises as to the wisdom of this tremendous speculation in housing. The New York Building Congress has issued a statement and a warning, and seems to think the situation is full of serious possibilities.

While New York City leads every other region, all records have been broken in the State and in northern New Jersey. In New England they are ahead of last year. The Middle Atlantic, Central West, and the Northwest do not make quite as good a showing, but even so the volume of business is far ahead of past records.

### Building Costs

BUILDING costs in the United States, in the midst of what economists have agreed is the country's greatest construction boom, have doubled in the last ten years, according to an announcement issued by the National Industrial Conference Board. In its announcement the board summarized the results of a study it has been making into the national building situation. A noteworthy development is that costs of labor and of materials stand at exactly the same increased levels, for the first time since 1920.

While in New York City the building crafts receive high wages, the study shows that last month they were the highest in the country in only ten out of twenty-five trades. Graphic charts accompanying the board's statement reveal the nation-wide character of rising costs, not alone in wages but in all materials entering into building. Other cities reporting uniformly high wages are Chicago, Cleveland, Pittsburgh, St. Louis, and Houston, Texas.

The conference board's investigation covered the leading American cities, and took in all the crafts and the leading elements in building material. Wage figures were based on government and other reports annually in May from 1914 to 1920, and monthly since August of that year.

Among the separate trades, plasterers and bricklayers receive the bulkiest pay envelopes in practically all cities. Bricklayers get $1.25 an hour in fifty cities, and plasterers in forty-four cities, while in St. Louis the rate is $1.75 an hour. Lathers and masons get $1.50 an hour in Houston, Texas, the same rate being received by roofers and hoisting engineers in New York. Masons get $1.25 an hour or more in twenty-eight cities, lathers in twelve cities, hoisting engineers in seven cities, and roofers in four.

Gasfitters and steamfitters in Houston, plumbers in Houston and Pittsburgh, ornamental iron-workers in Cleveland, marble-setters in Philadelphia, and tile-setters in Shreveport, La., all get $1.37½ an hour. In New York the trades best paid next to those above cited are carpenters, cement finishers, painters, pipe-coverers, sheet-metal workers, and structural iron-workers. These get $1.31¼ an hour. Although their wages are less, steamfitters' helpers and laborers get the highest wages in the country in New York.

The hod-carrier, once figuring prominently as the butt of cartoon and caricature, now counts himself among the aristocracy of labor, according to the board's survey, for he earns up to $1.25 an hour, and the average earned by all hod-carriers is more than 90 cents an hour, in the cities surveyed.

The same sustained high levels as shown by the trades mentioned are also being experienced by plumbers, electricians, carpenters, and sheet-metal workers.

Prices of building materials until recently more than kept pace with the rise in wages, the announcement reveals. It shows that from 1915 to 1920 the prices of materials increased more than twice as much as wages. In 1921, however, they fell to approximately the same level as wages, and during the past year the present 100 per cent increase over 1914 in both was established.

Cast-iron pipe is the most expensive commodity in construction, as compared with 1914 wholesale costs, showing an increase of 306 per cent. Other materials which have more than doubled in the past ten years are Douglas fir, lime, white pine, white lead, and turpentine.

Sheet-copper and copper wire show the least advances over 1914 of only 4 and 5 per cent. Pine flooring and structural steel show great reductions over the peak period.

The general trend of building costs, taken as a whole, is a tendency downward for materials and a rising tendency in wages. There was nothing adduced in the survey to indicate appreciable reductions in building costs in the near future, conditions in the United States as a whole being considered.

## The Paris Prize Memorial Fund of the Beaux-Arts Institute of Design

THIS is a fund being raised as a memorial to the late Lloyd Warren, who was director of the Beaux-Arts Institute of Design, and who died in November, 1922.

The Institute sends one man to the Ecole des Beaux-Arts in Paris each year, after winning a national architectural competition. He receives the sum of about $2,000 a year, for two years, for his expenses and cost of travel.

The Institute is raising $40,000 to add to the existing endowment, in order to make this prize permanent and fully endowed. Up to the present time we have received nearly $25,000 from architects of all kinds, with and without Beaux-Arts training or interest, and from many private individuals.

The work of the Beaux-Arts, at 126 East 75th Street, in giving practically free education in architecture, sculpture, and mural decoration, is well known throughout the country. It now has over fourteen hundred students, both college men and draftsmen.

Contributions may be sent to Henry R. Sedgwick, Treasurer, 522 Fifth Avenue, New York City, Trustee and Chairman of the Finance Committee.

## Pierre L. LeBrun: In Memoriam

PIERRE L. LEBRUN, born December 27, 1846, died February 14, 1924. Member of the American Institute of Architects since 1874. Fellow of the American Institute of Architects since 1883. Medal of Honor of the New York Chapter, A.I.A., 1910. Founder of the LeBrun Travelling Scholarship, 1910.

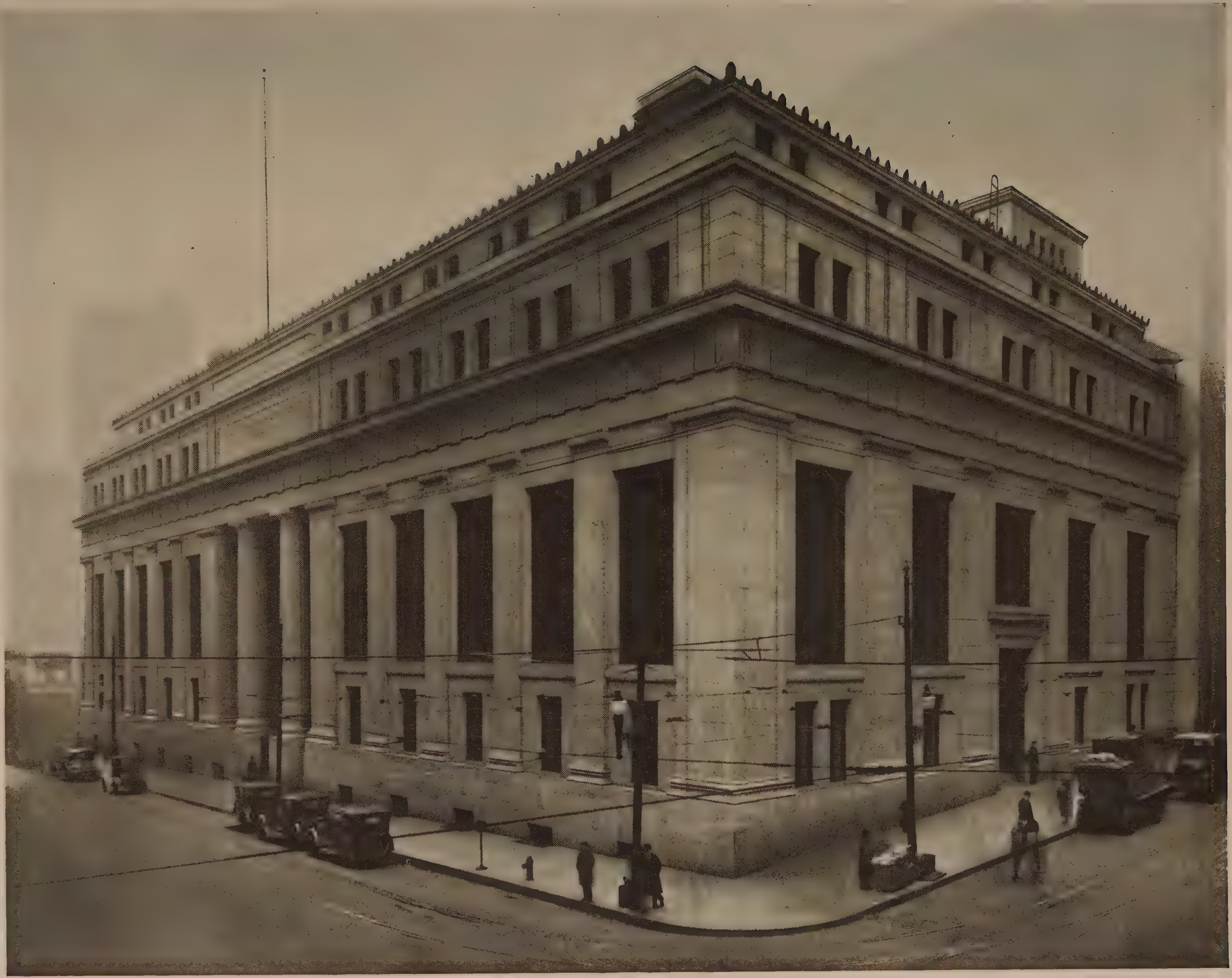
Son and brother of an architect, his entire manhood was given to the practice of that profession and to its advancement as an art. In partnership with his father Napoleon, and his brother Michel, he contributed many notable buildings to the growth of New York City. The completion of the Metropolitan Life Tower, in 1910, marking the close of a long and honorable career, became the occasion of the award of the New York Chapter A.I.A. Medal of Honor to the brothers Pierre and Michel.

Mr. LeBrun's interests, however, were not limited to his practice. He was alive to the necessity of enabling the American architect to obtain a proper education. His extensive travels abroad aroused his sympathy for those, less fortunate than he, who were unable to see the monuments of European civilization. To mitigate this condition he formed the Willard Collection of Architectural Casts in the Metropolitan Museum of Art, and later followed it by the gift of the Pierre L. LeBrun Library to that museum. A similar gift to the Montclair Art Association established an art library in its museum.

## Lewis Colt Albro

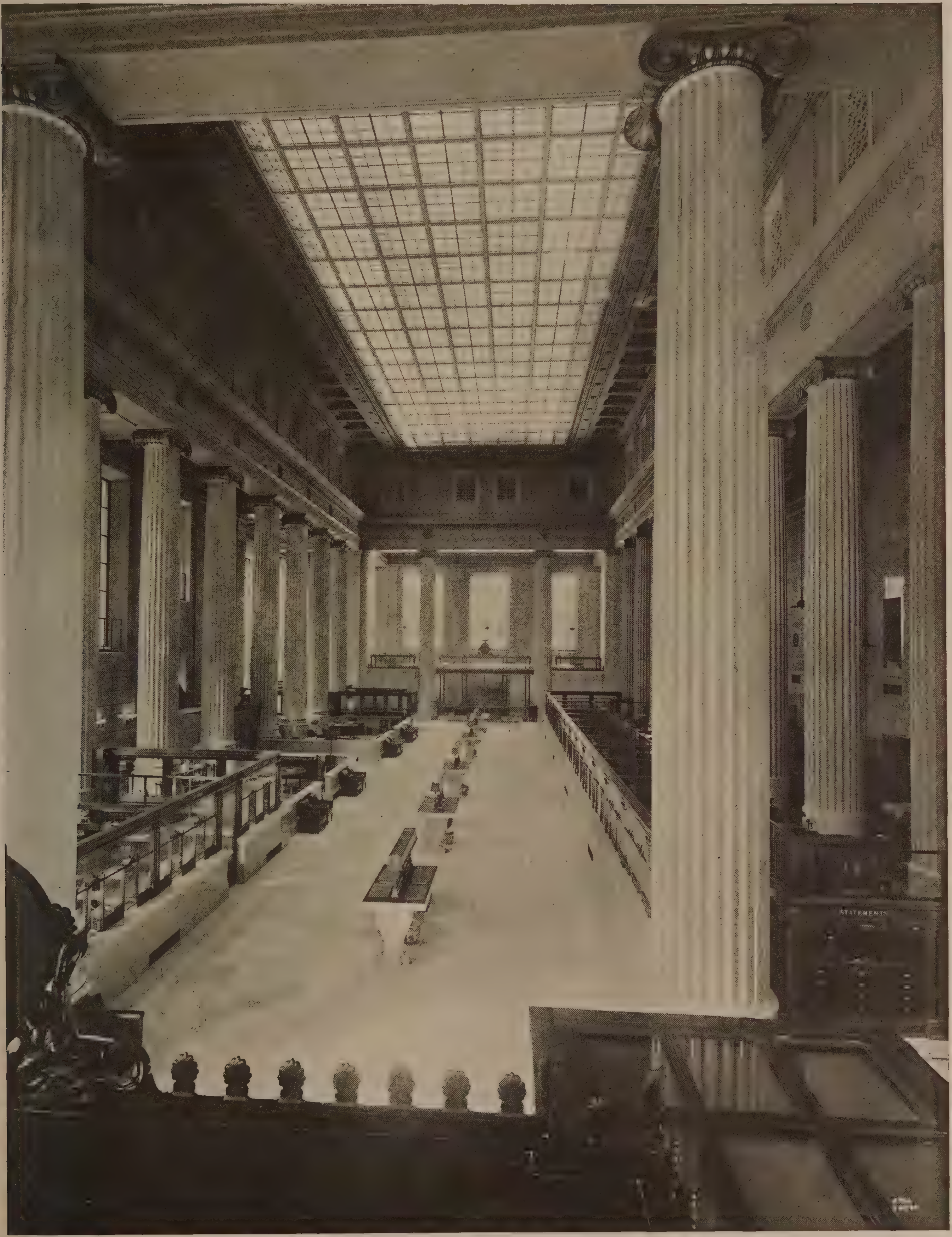
LEWIS COLT ALBRO was born in Paris, France, February 4, 1876, and died in New York March 1, 1924. He was educated in public and private schools in Pittsfield, Mass., and attended the Metropolitan Art School, conducted at the Metropolitan Art Museum under the auspices of Columbia University. He entered the office of McKim, Mead & White, and remained with that firm for a period of some thirteen years, after which he formed an association with Harrie T. Lindeberg, and practised for a number of years under the firm name of Albro & Lindeberg, producing many notable examples of domestic work and some commercial structures. This partnership was dissolved about ten years ago, since which time Mr. Albro has practised alone, confining his talents principally to private-house work. Mr. Albro distinguished himself during his professional career not so much for the magnitude or variety of his commissions as by the character and quality of each particular piece of work intrusted to him.

Among the distinctive houses designed by him are the following: The residences of Mrs. Charles T. Ballard, Louisville, Ky.; Doctor M. E. Johnston, Lexington, Ky.; Mr. George Arents, Jr., Rye, N. Y.; Mr. Frank D. Potter, Rye, N. Y.; Mr. Jerome Mendleson, Albany, N. Y.; Mr. John L. Bushnell, Springfield, Ohio; farm buildings of Doctor Ernest Fahnestock in Putnam County, N. Y.; Mendleson Memorial Chapel, Londonville, N. Y.



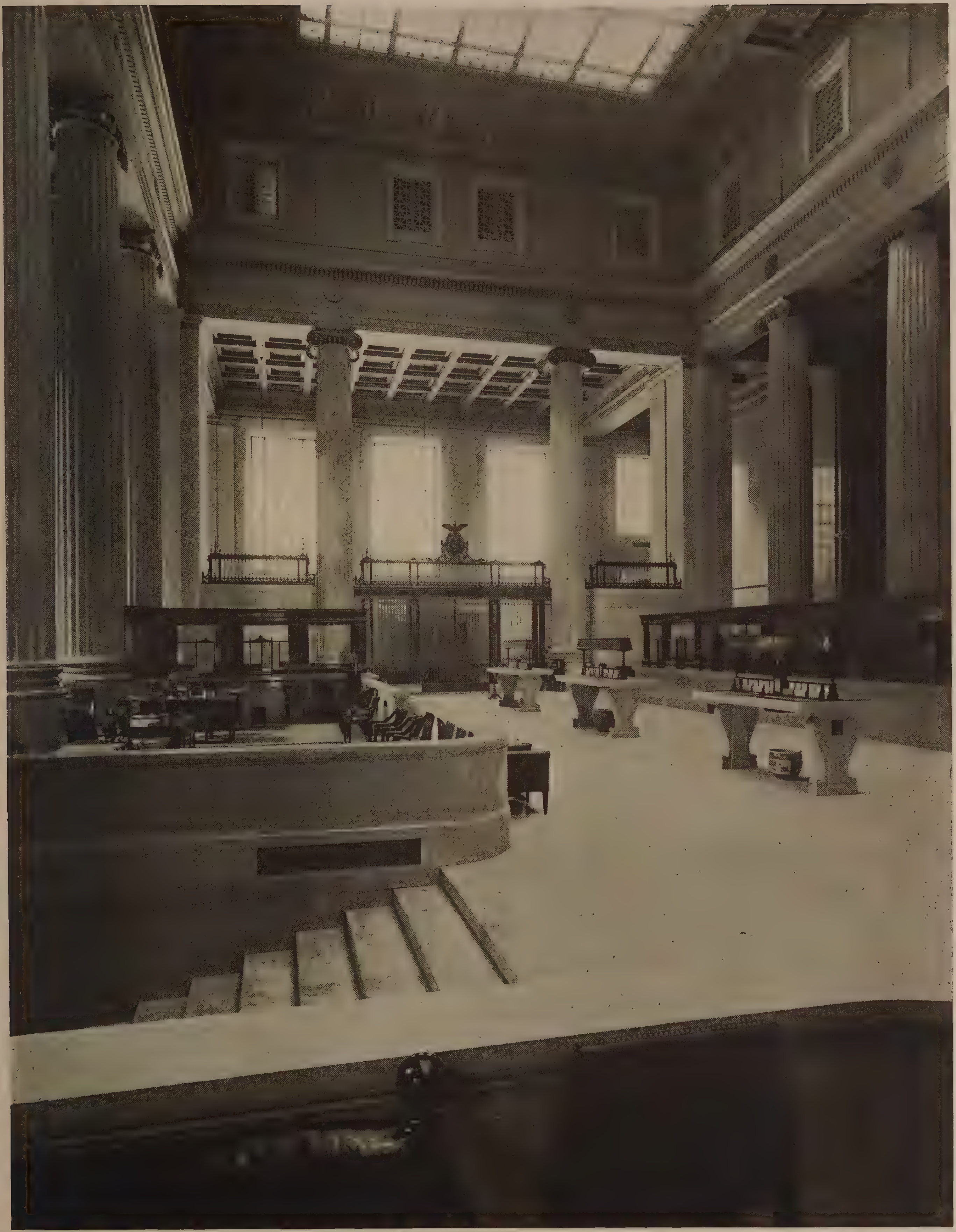
THE MELLON NATIONAL BANK, PITTSBURGH, PA.

Trowbridge & Livingston and E. P. Mellon, Architects.



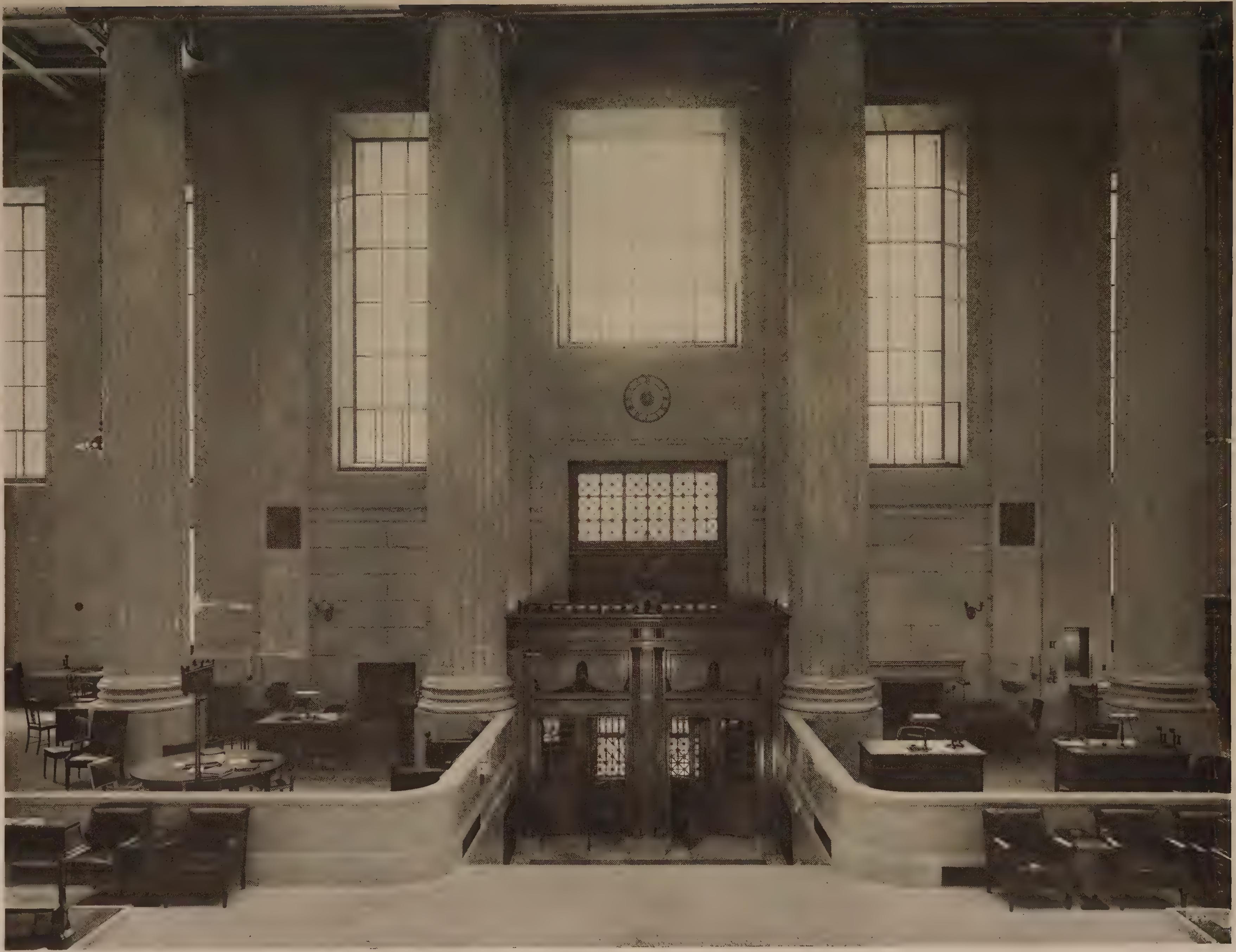
THE BANKING–ROOM FROM FIFTH AVENUE ENTRANCE TO OLIVER AVENUE.

THE MELLON NATIONAL BANK, PITTSBURGH, PA.
Trowbridge & Livingston and E. P. Mellon, Architects.



DETAIL OF OLIVER AVENUE END WITH BRONZE VAULT SCREEN. Trowbridge & Livingston and E. P. Mellon, Architects.

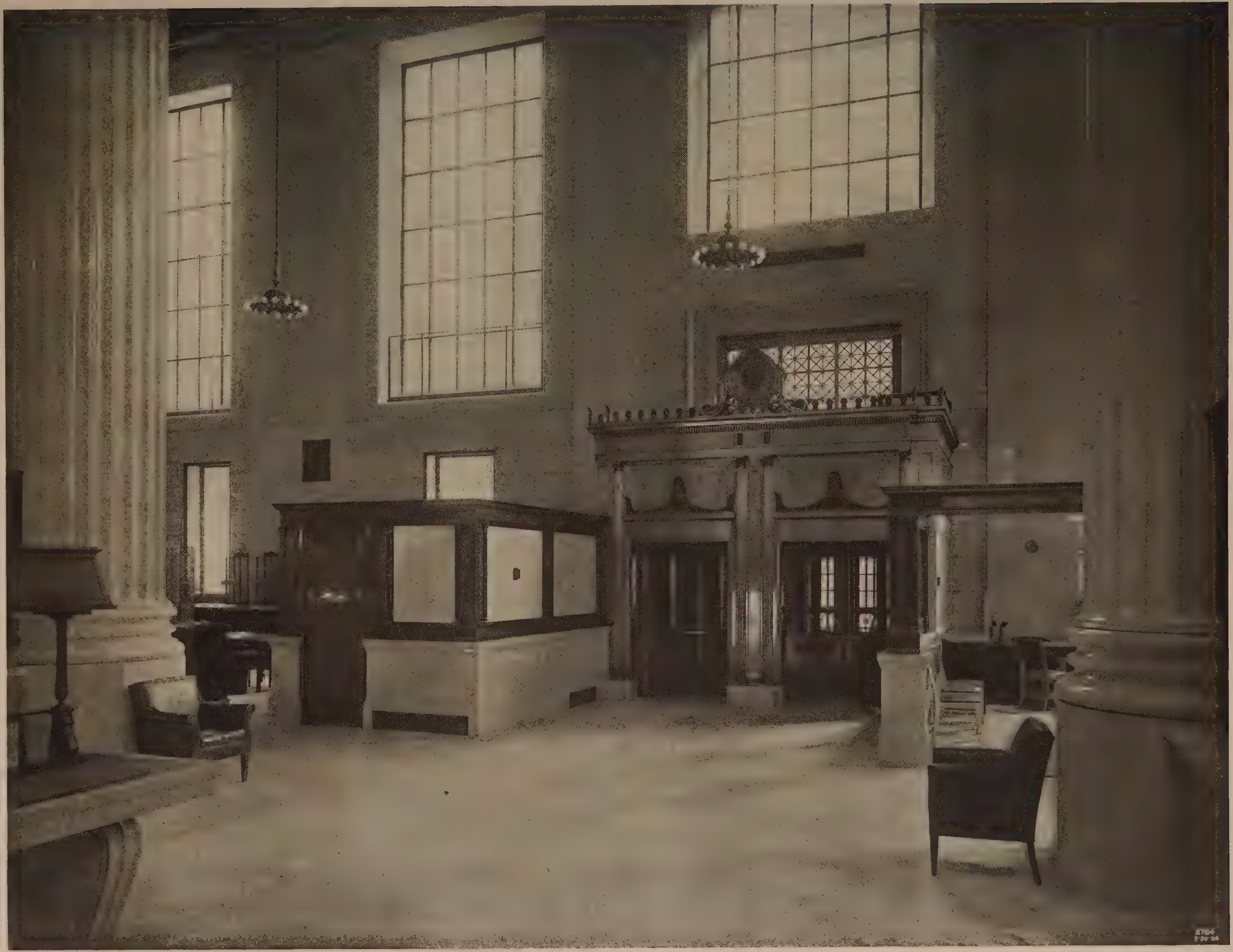
THE MELLON NATIONAL BANK, PITTSBURGH, PA.



TOWARD SMITHFIELD AVENUE ENTRANCE.

THE MELLON NATIONAL BANK, PITTSBURGH, PA.

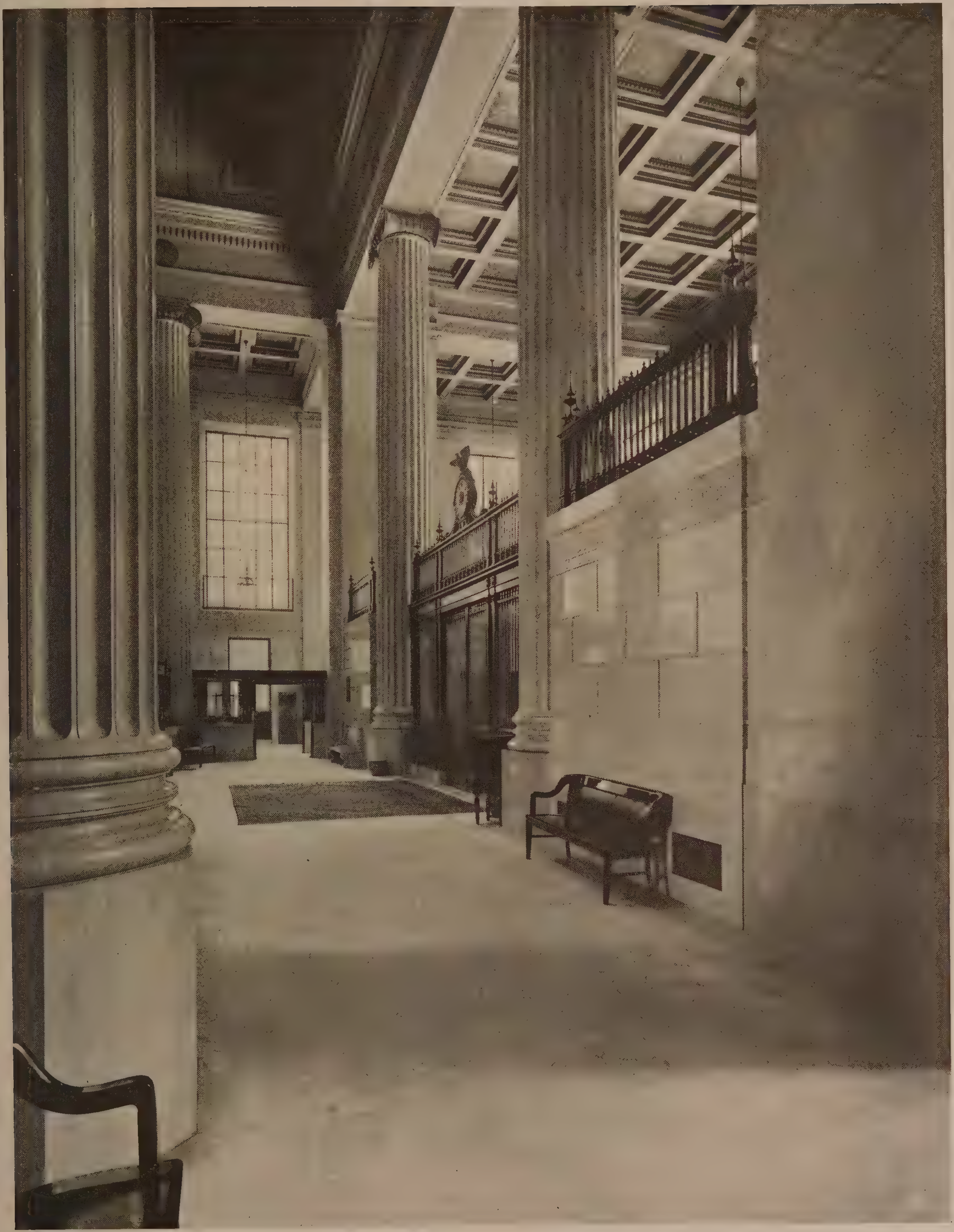
Trowbridge & Livingston and E. P. Mellon, Architects.



FIFTH AVENUE ENTRANCE.

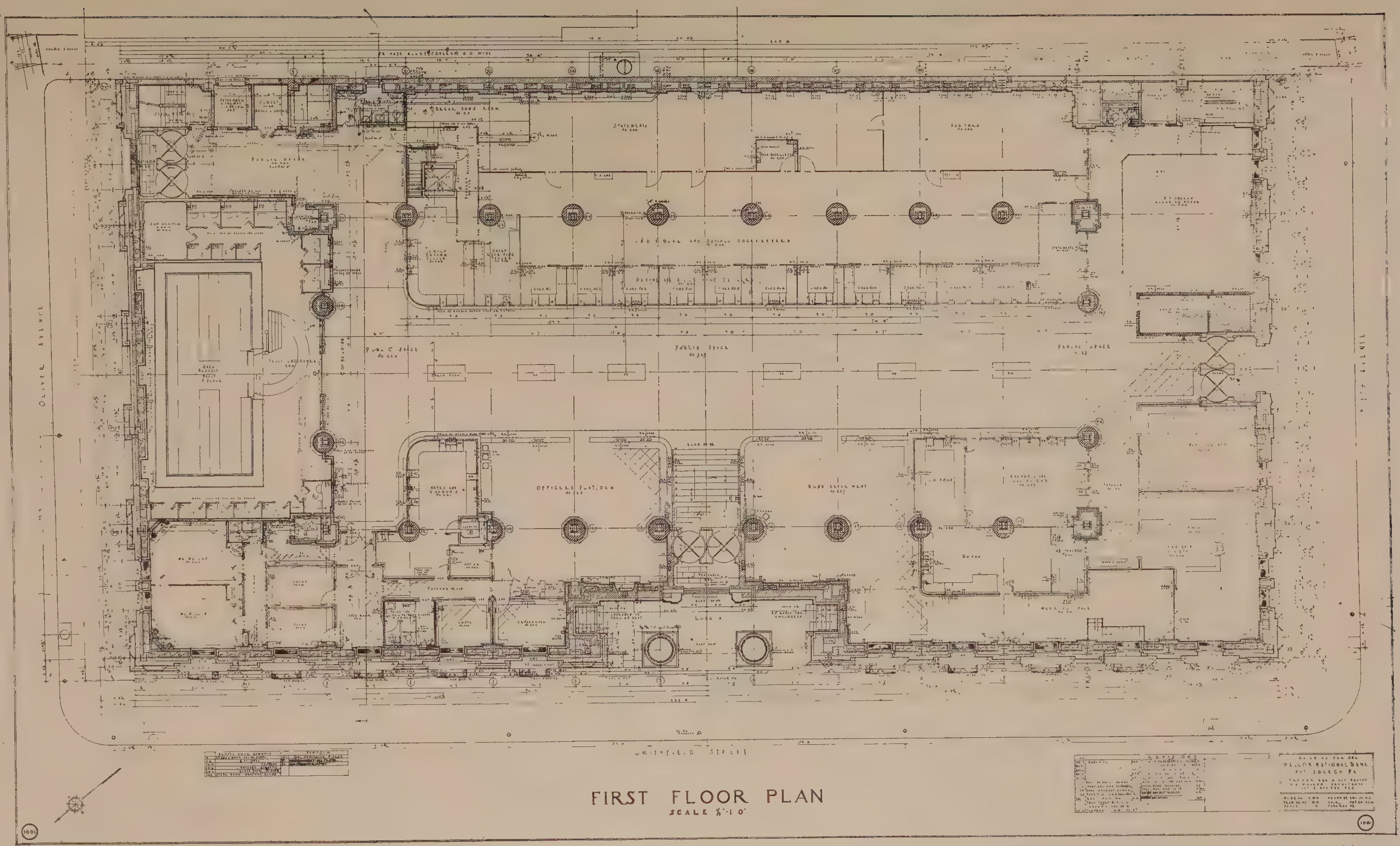
Trowbridge & Livingston and E. P. Mellon, Architects.

THE MELLON NATIONAL BANK, PITTSBURGH, PA.



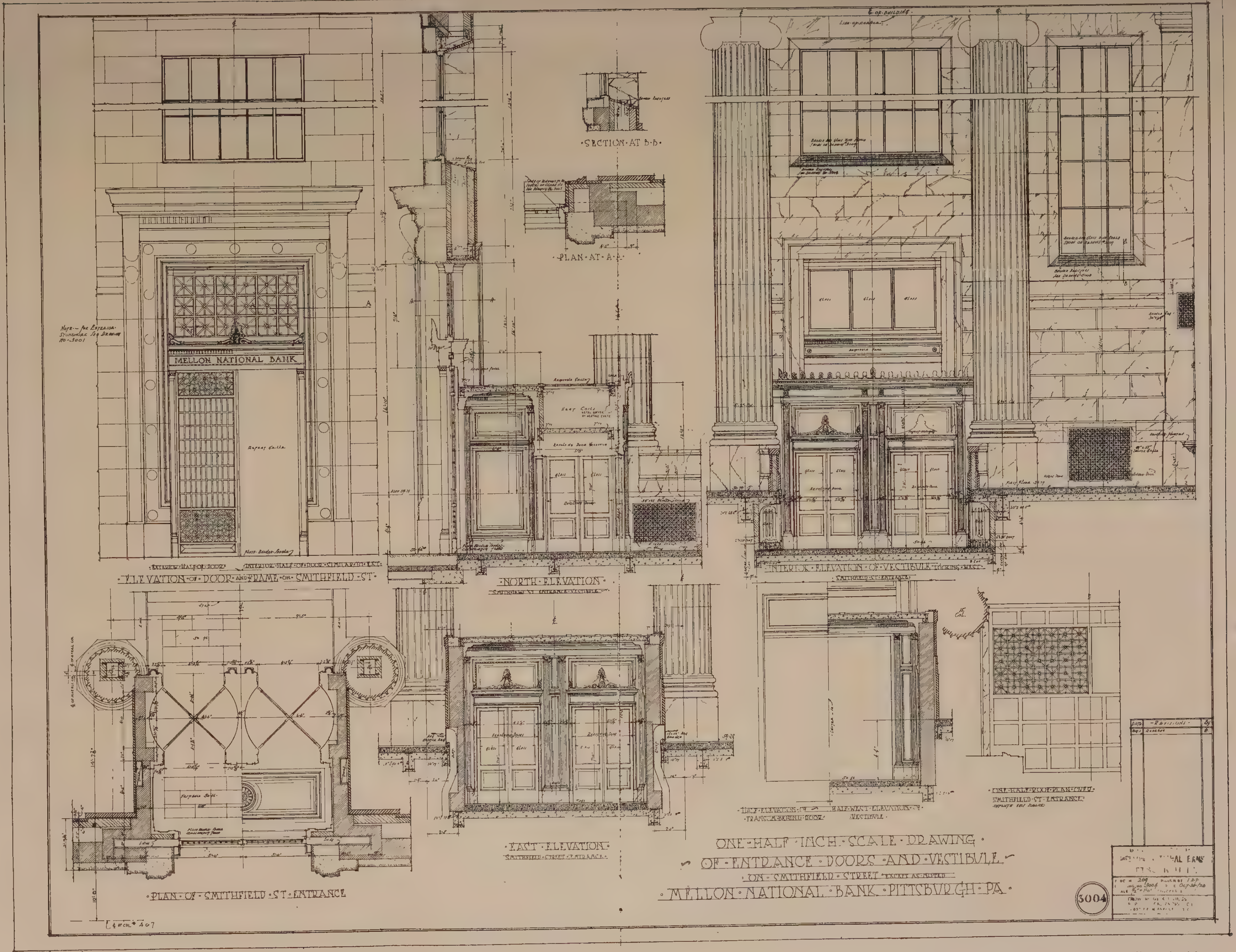
DETAIL, OLIVER AVENUE END OF BANKING-ROOM. Trowbridge & Livingston and E. P. Mellon, Architects.

THE MELLON NATIONAL BANK, PITTSBURGH, PA.



THE MELLON NATIONAL BANK, PITTSBURGH, PA.

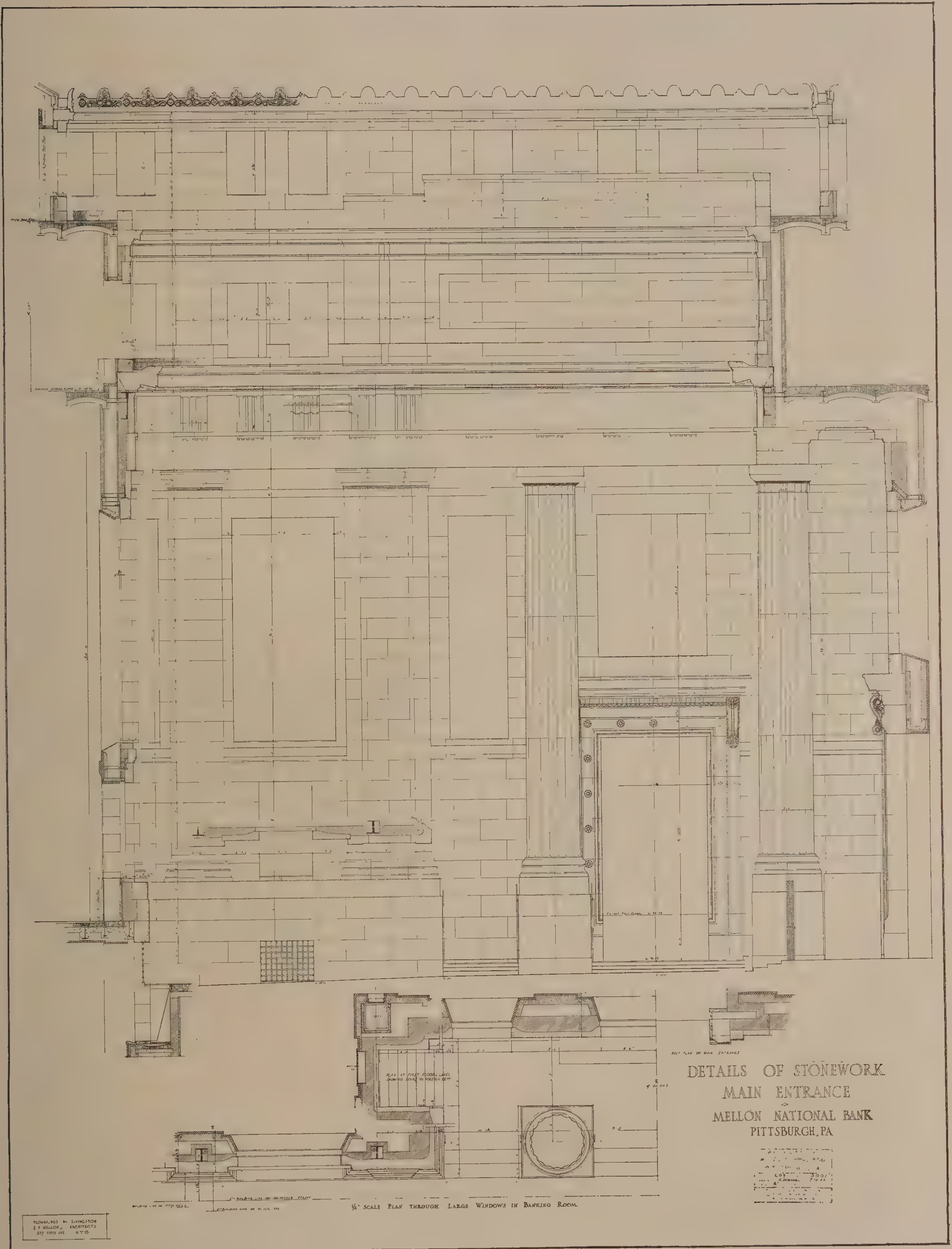
Trowbridge & Livingston and E. P. Mellon, Architects.


·SECTION·AT·B·B·
·PLAN·AT·A·A·
MELLON NATIONAL BANK
Note— for Exterior Stonework See Drawing No-3001
EXTERIOR·HALF·OF·DOOR
INTERIOR·HALF·OF·DOOR·SIMILAR·TO·EXT.
·ELEVATION·OF·DOOR·AND·FRAME·ON·SMITHFIELD·ST·
·NORTH·ELEVATION·
SMITHFIELD ST. ENTRANCE VESTIBULE
·INTERIOR·ELEVATION·OF·VESTIBULE·LOOKING·WEST·
SMITHFIELD ST. ENTRANCE
·PLAN·OF·SMITHFIELD·ST·ENTRANCE
·EAST·ELEVATION·
SMITHFIELD STREET ENTRANCE
·HALF·ELEVATION·OF TRANSOM·BEHIND·DOOR·
·HALF·WEST·ELEVATION·OF·VESTIBULE·
·ONE·HALF·ROOF·PLAN·OVER SMITHFIELD·ST·ENTRANCE·
ONE·HALF·INCH·SCALE·DRAWING·
OF·ENTRANCE·DOORS·AND·VESTIBULE
·ON·SMITHFIELD·STREET·EXCEPT AS NOTED
·MELLON·NATIONAL·BANK·PITTSBURGH·PA·
3004
Revisions

SCALE DRAWING, ENTRANCE DOORS AND VESTIBULE.

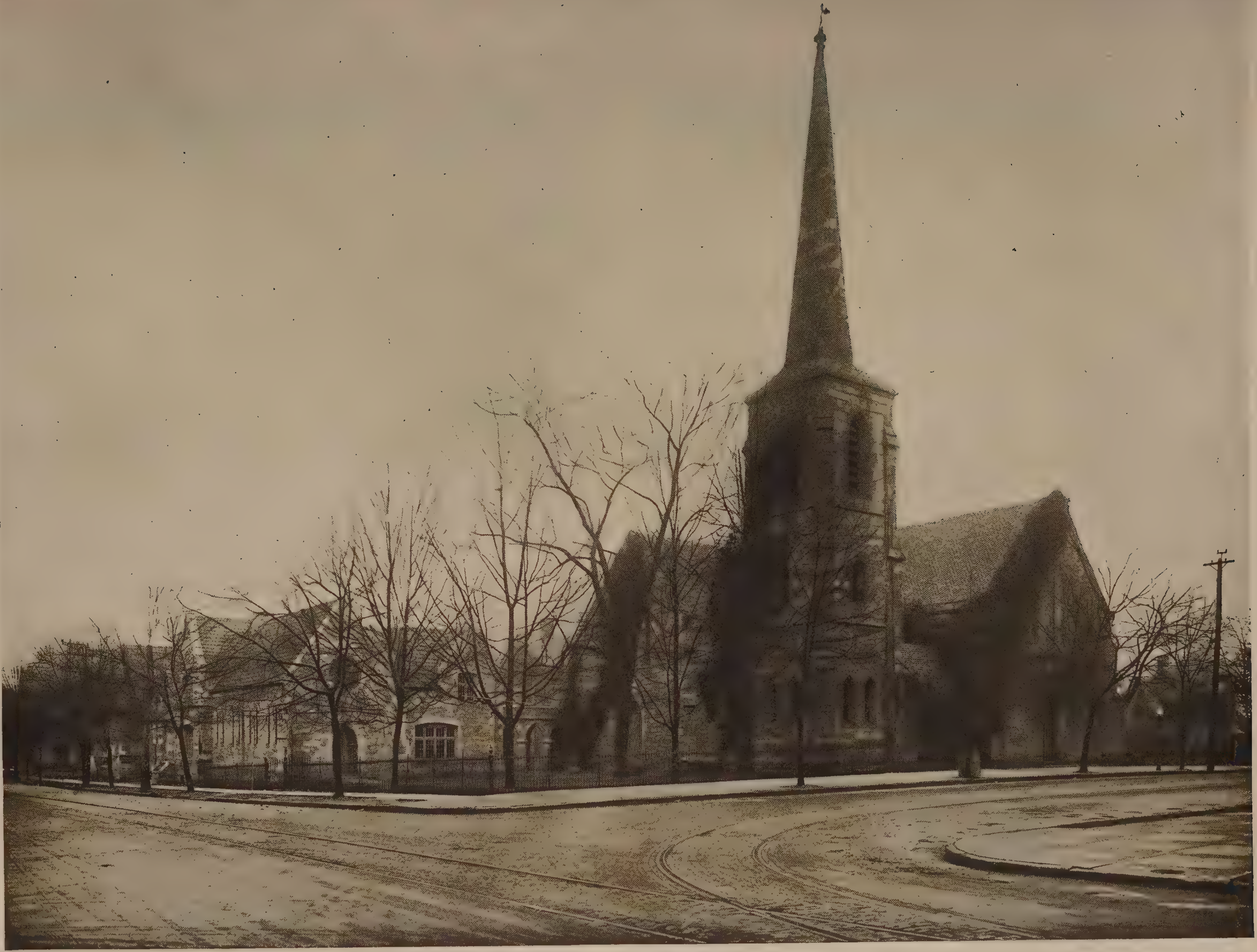
Trowbridge & Livingston and E. P. Mellon, Architects.

THE MELLON NATIONAL BANK, PITTSBURGH, PA.



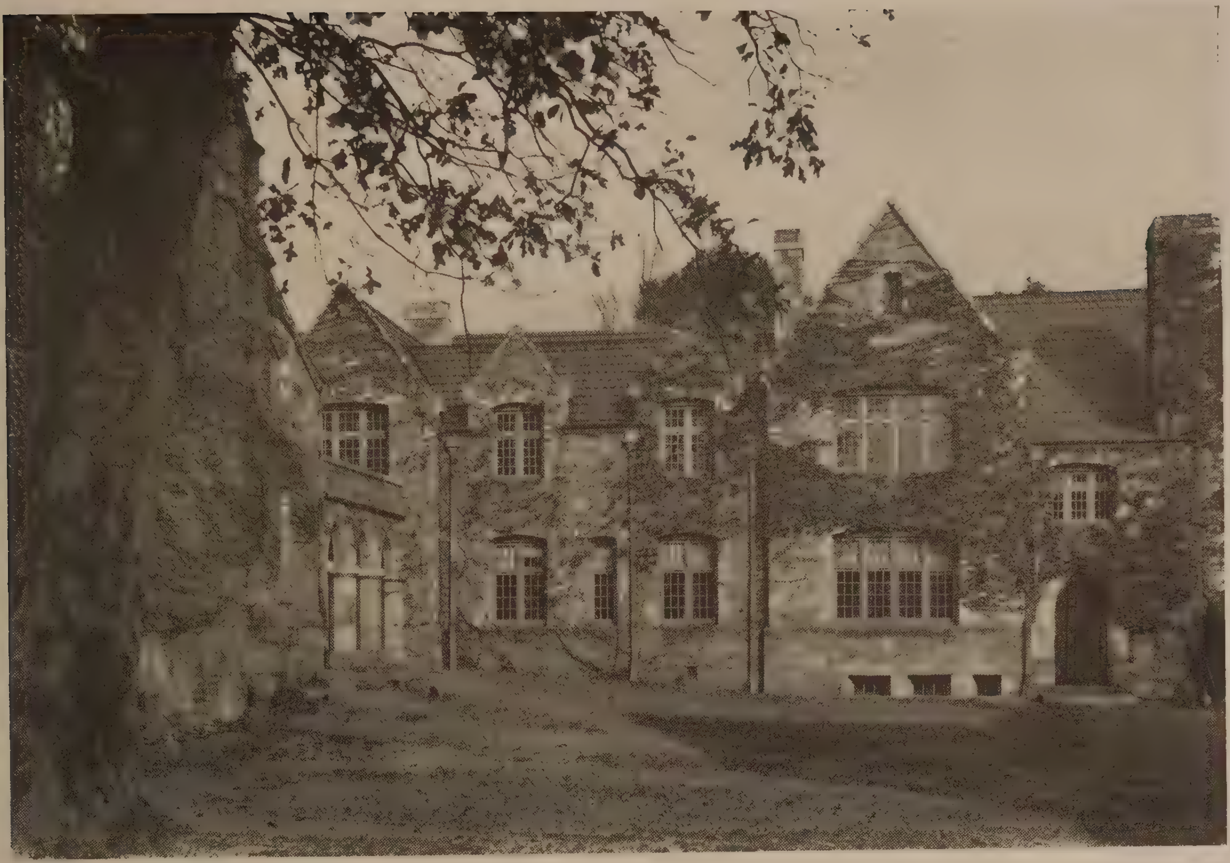
THE MELLON NATIONAL BANK, PITTSBURGH, PA.

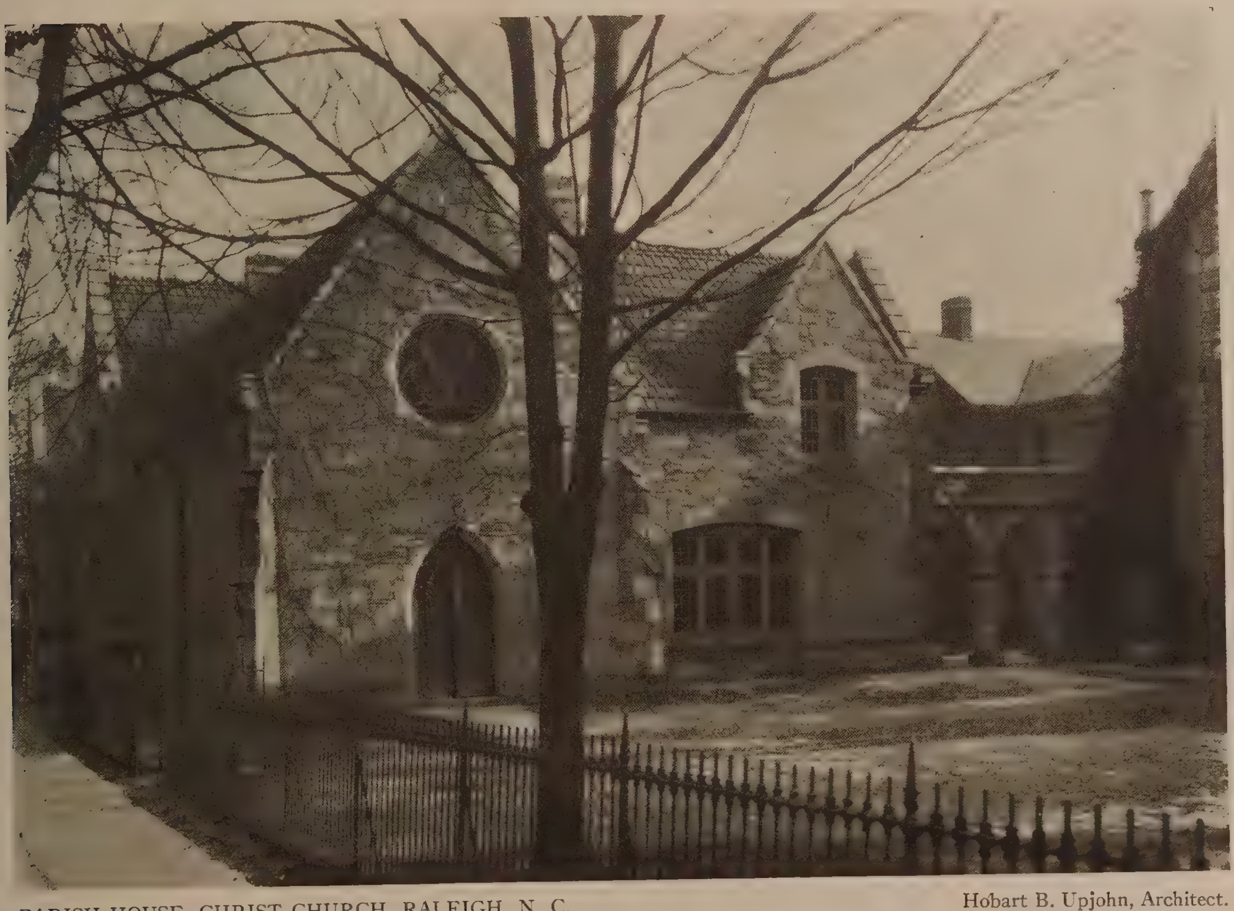
Trowbridge & Livingston and E. P. Mellon, Architects.



CHRIST CHURCH, RALEIGH, N. C.

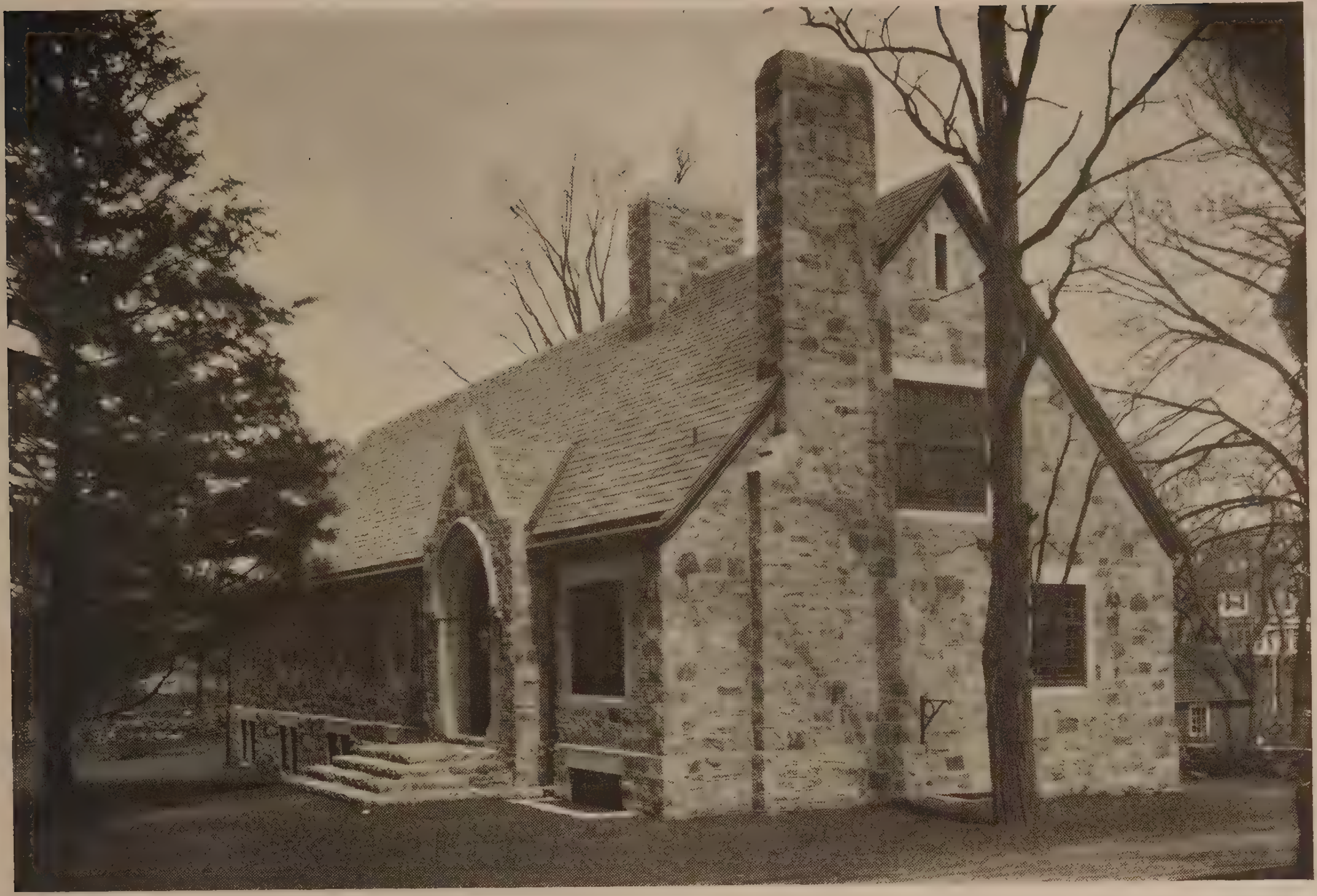
The parish of Christ Church was organized in 1821. In 1823 the Right Reverend John Stark Ravenscroft was vested with the joint offices of Bishop of North Carolina and Rector of Christ Church. In 1849 the present granite structure was begun, and was completed in less than five years. It was designed by the most famous church architect of that day, Richard Upjohn, who also planned Trinity Church, New York, and other sacred edifices. The parish house, also shown in illustration, was begun in 1913, and its architect was Hobart Upjohn, grandson of the original designer of the church building.



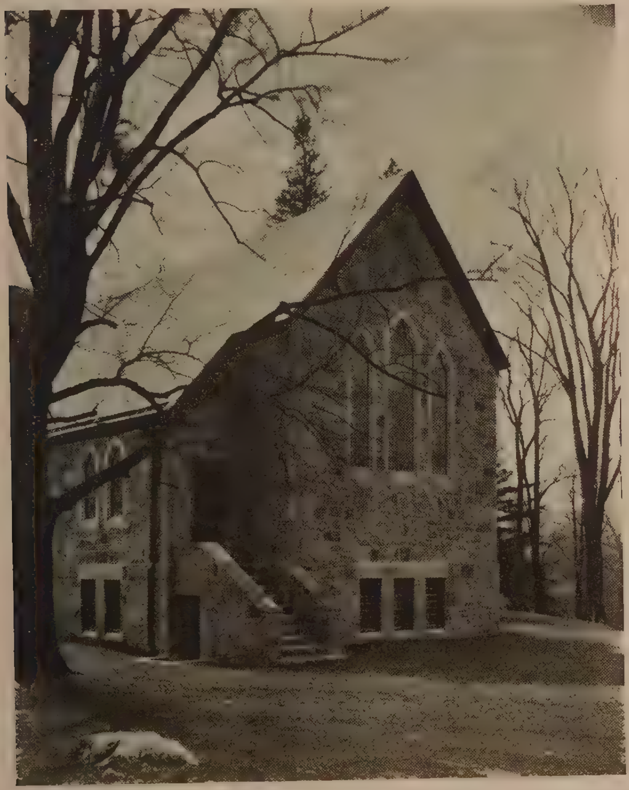


PARISH HOUSE, CHRIST CHURCH, RALEIGH, N. C.

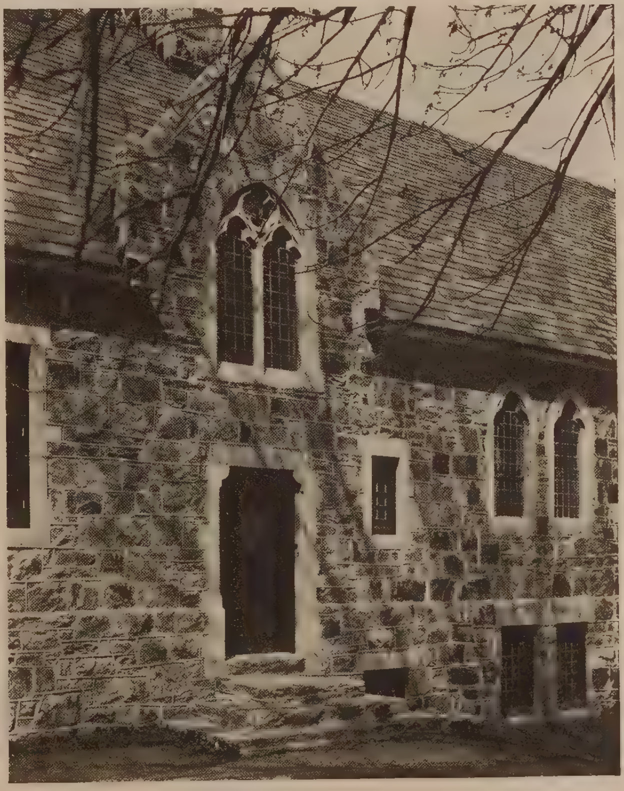
Hobart B. Upjohn, Architect.



MAIN FRONT.

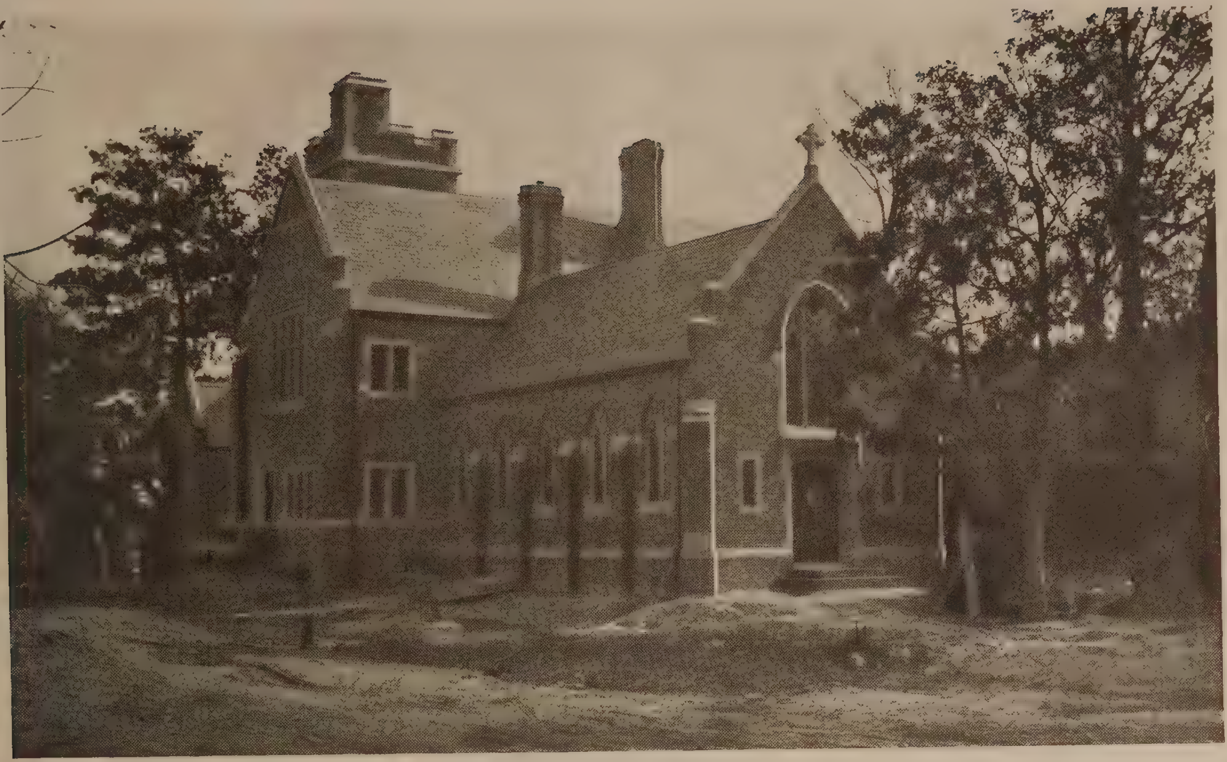


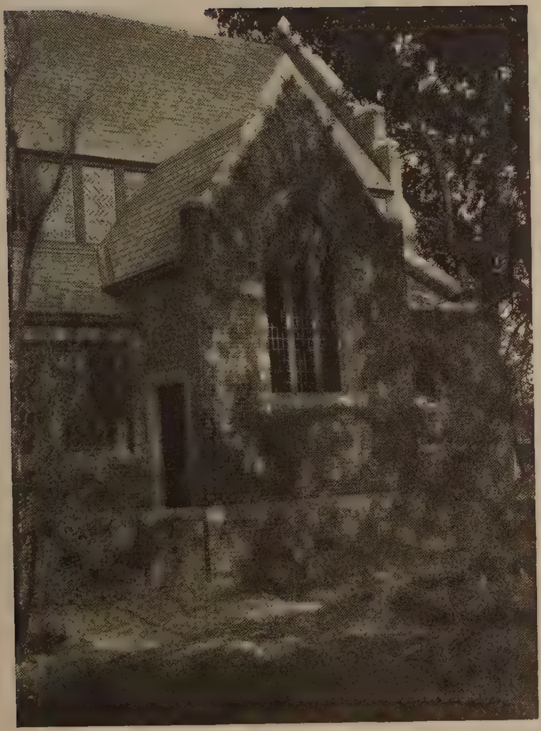
NORTH END.

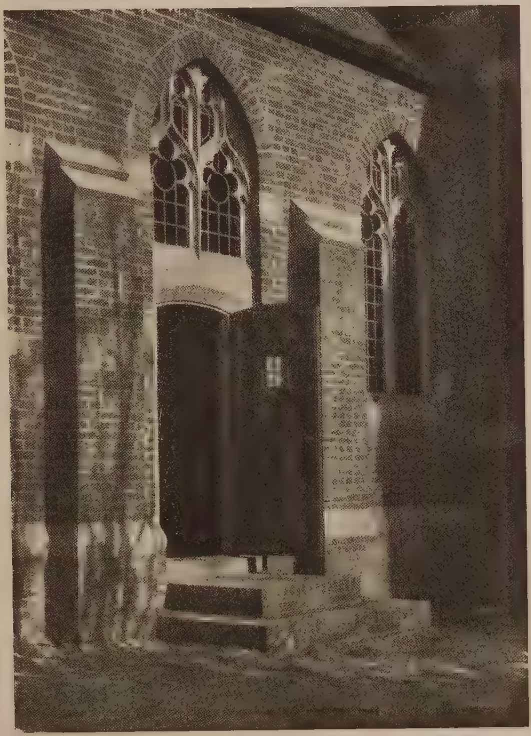


REAR ENTRANCE DETAIL.

PARISH HOUSE, ST. JAMES THE LESS, SCARSDALE, N. Y.
Hobart B. Upjohn, Architect.

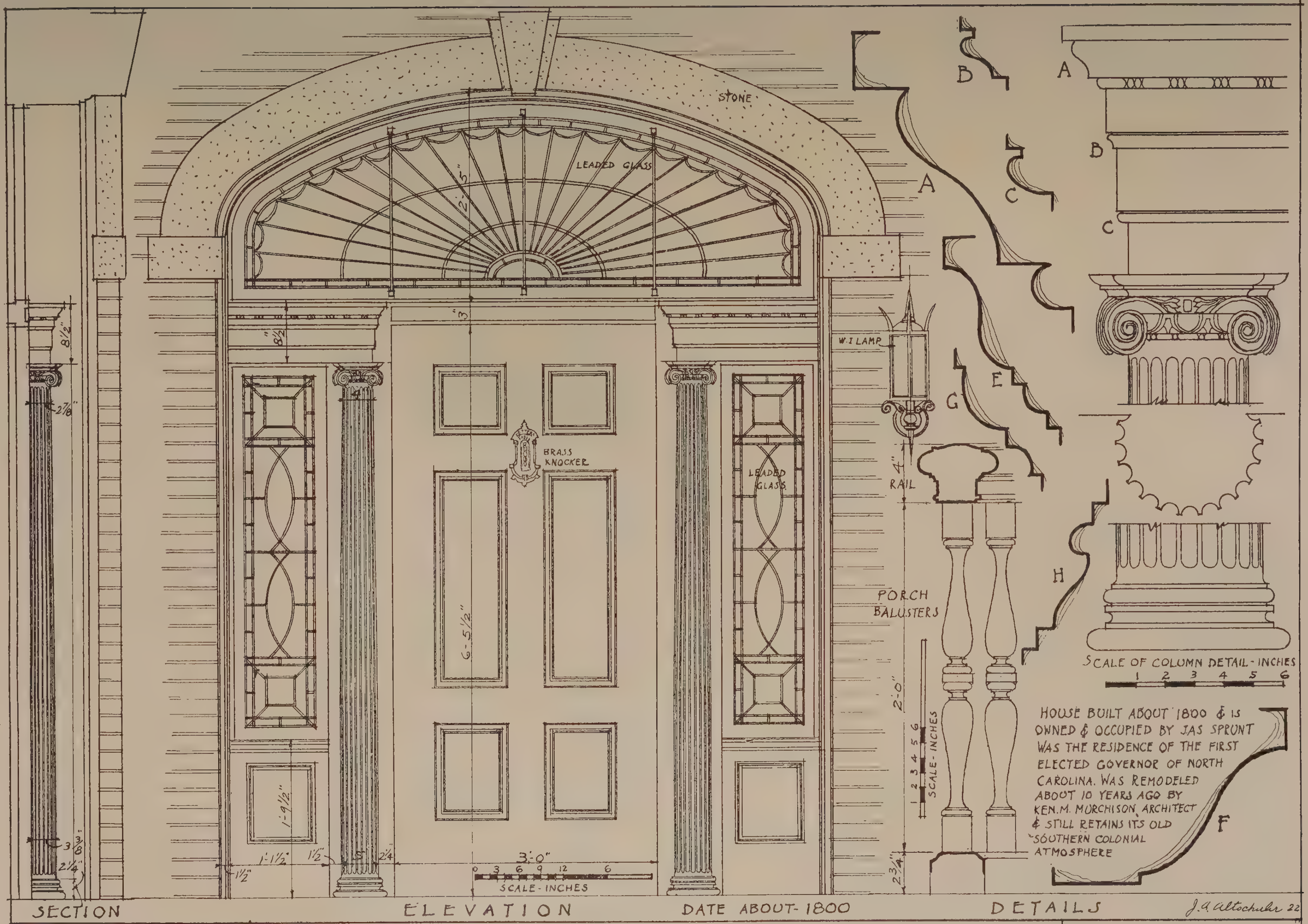






CHESHIRE MEMORIAL PARISH HOUSE, TARBORO, N. C.

Hobart B. Upjohn, Architect.



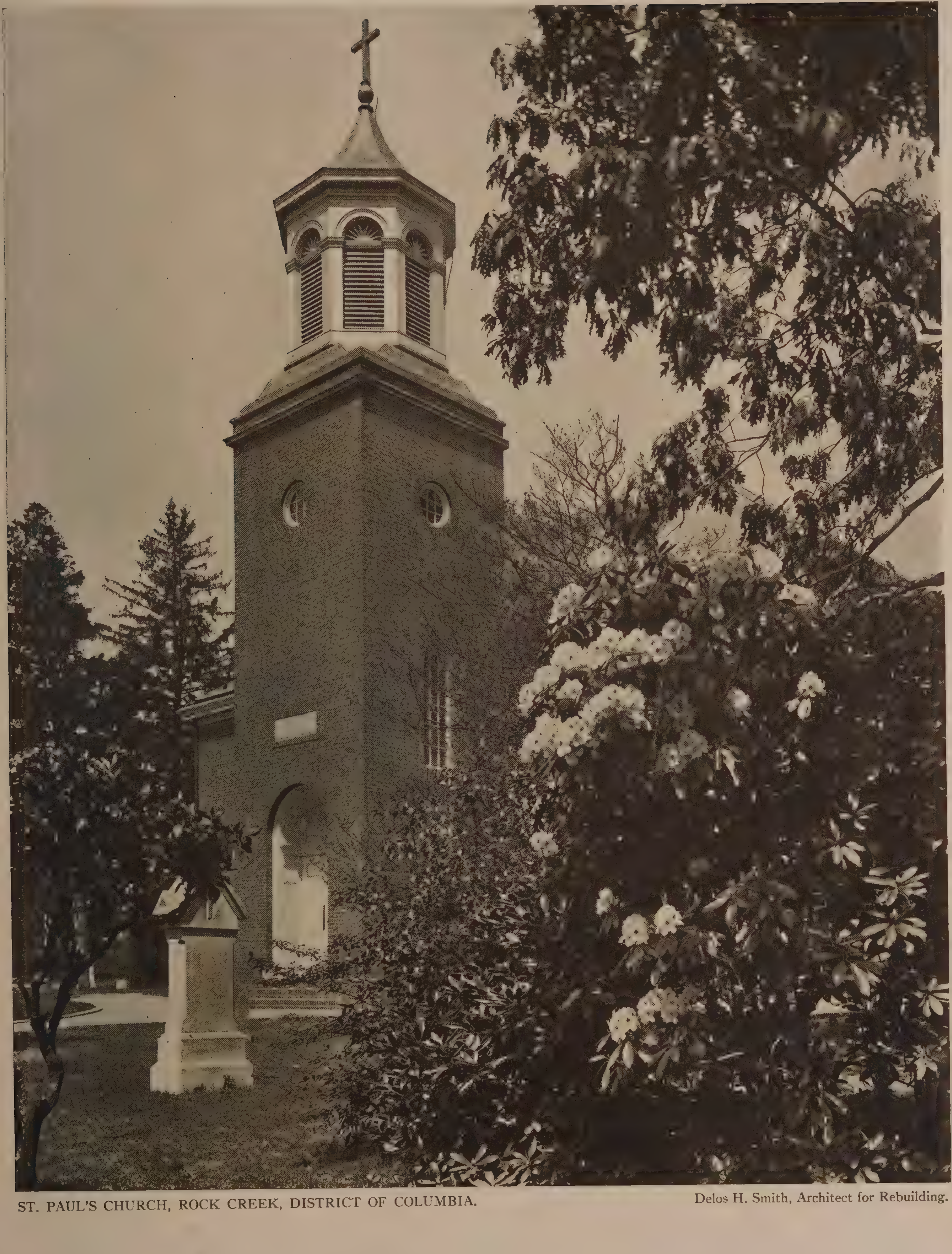
HOUSE BUILT ABOUT 1800 & IS OWNED & OCCUPIED BY JAS SPRUNT WAS THE RESIDENCE OF THE FIRST ELECTED GOVERNOR OF NORTH CAROLINA. WAS REMODELED ABOUT 10 YEARS AGO BY KEN. M. MURCHISON, ARCHITECT & STILL RETAINS ITS OLD "SOUTHERN COLONIAL" ATMOSPHERE

COLONIAL ARCHITECTURE of the CAROLINAS'

# DOORWAY of the SPRUNT HOUSE

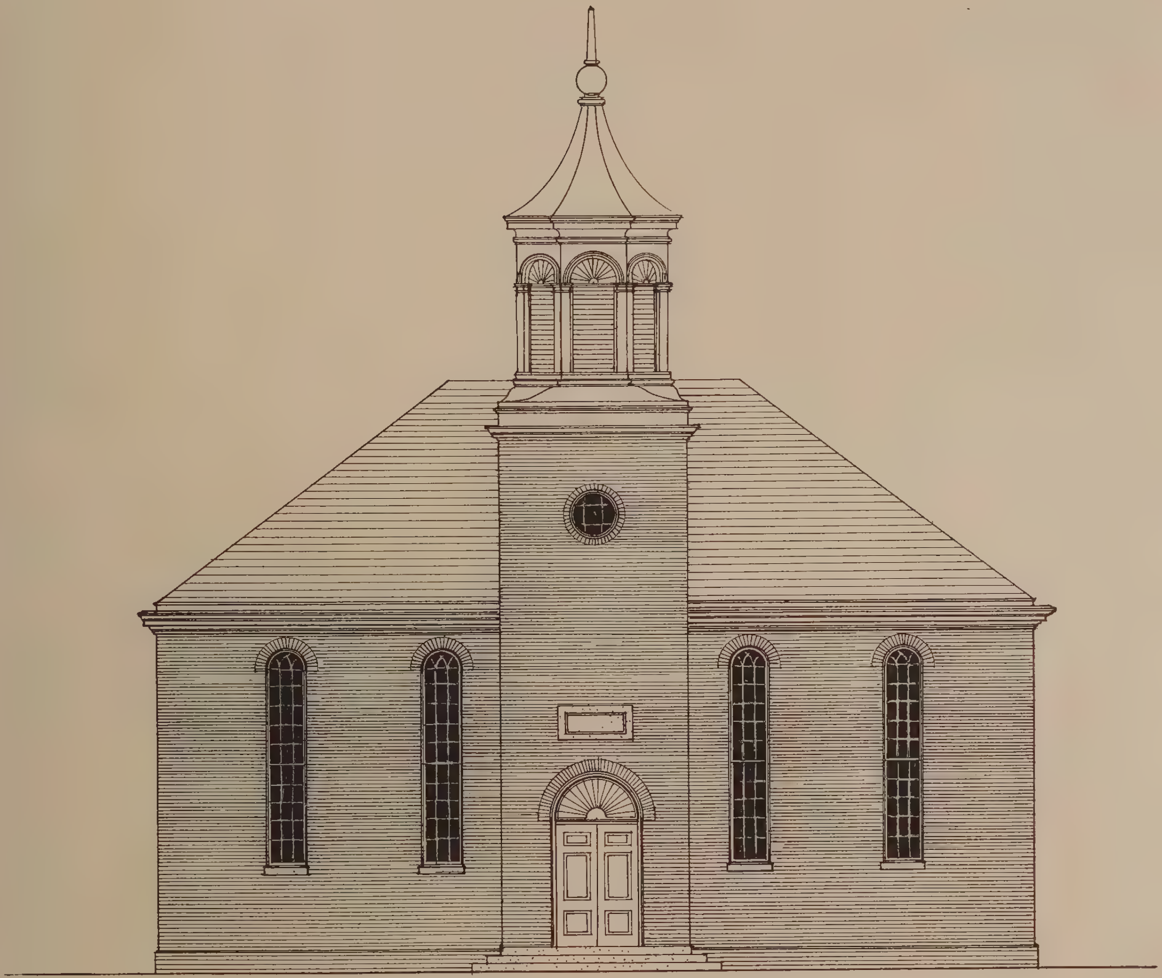
COR. of SOUTH FRONT & NUN STS. WILMINGTON NOR. CAROLINA

MEASURED & DRAWN by J. A. ALTSCHOLER



ST. PAUL'S CHURCH, ROCK CREEK, DISTRICT OF COLUMBIA.

Delos H. Smith, Architect for Rebuilding.



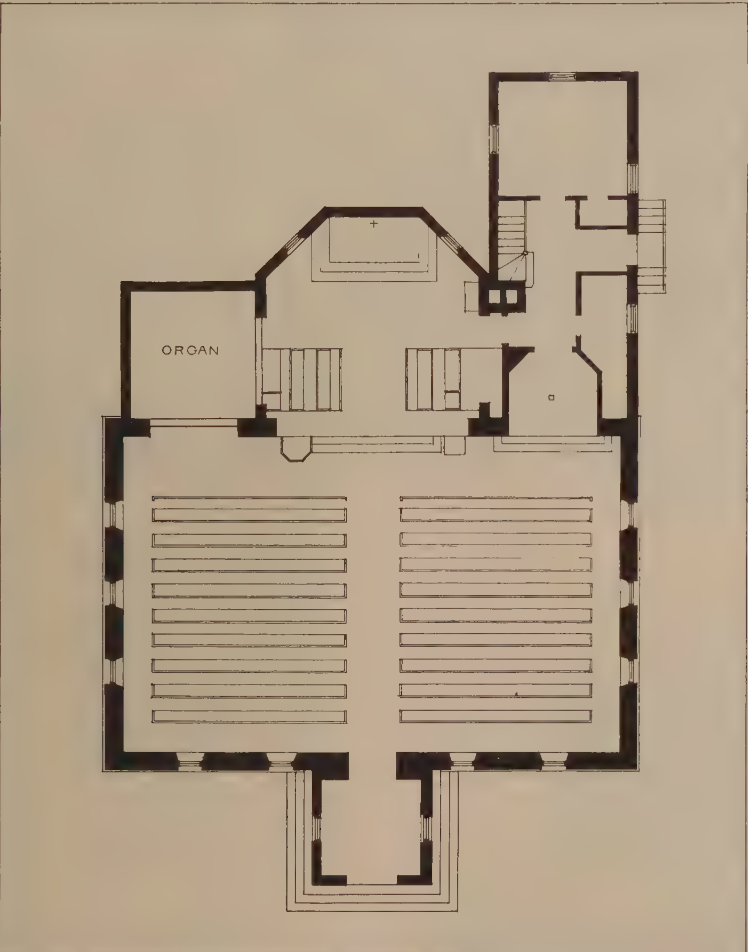
ST. PAUL'S CHURCH, ROCK CREEK, DISTRICT OF COLUMBIA.

Delos H. Smith, Architect for Rebuilding.

# St. Paul's Church, Rock Creek, District of Columbia

Delos H. Smith, Architect for the Rebuilding

EARLY among the old parishes of southern Maryland we find that of Broad Creek, founded soon after the establishment of the Episcopal Church in Maryland in 1692. The original church building is still standing near Fort Washington on the Potomac River. From this central group several other outlying churches were established along the upper reaches of the river, and one of these, covering the area that is now the District of Columbia, came to be called Rock Creek Parish.



Plan, rebuilding St. Paul's Church, Rock Creek, District of Columbia.

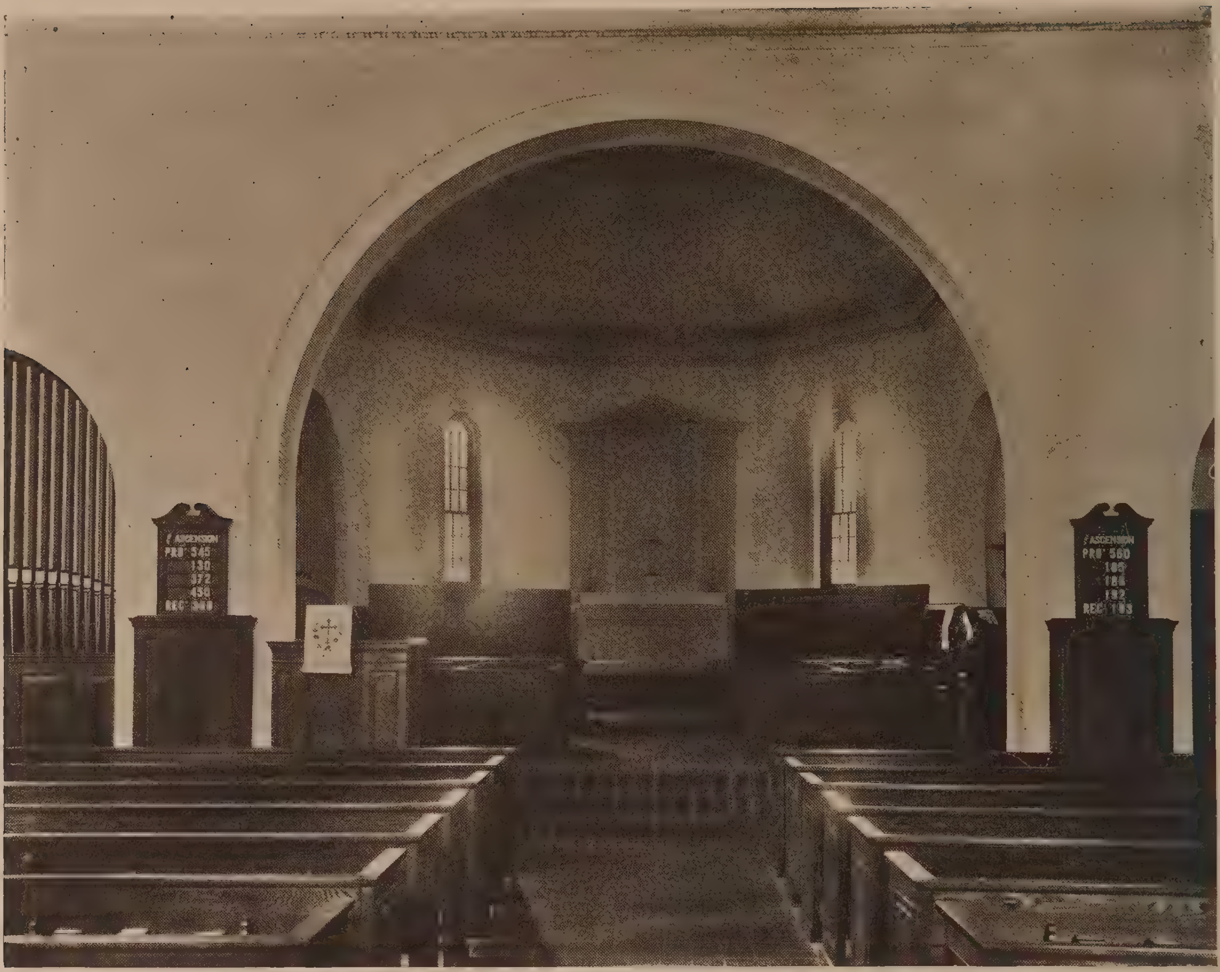
A house of worship for this pioneer congregation was built of logs early in the eighteenth century, at the point most centrally located for the widely scattered settlements. This is the site to-day of St. Paul's Church, erected in 1776 after an earlier brick church had been destroyed by fire. The cemetery, developed on the section of land bequeathed to the parish before the Revolution, surrounds the church, and, with the National Soldiers' Home, covers the highest eminence of the neighborhood.

The original building is about forty by sixty feet, and was originally arranged with chancel cut off by a rail at the east end, three windows facing the east, and at the far end two entrance doors to the west. On each long side, north and south, were five windows, and above these a second tier, as if a gallery were contemplated for growth. The old brick walls, east, west, and south, are still standing in spite of a destructive fire in 1921. The high ceiling was flat and the roof angle about forty-five degrees and hipped. Lines and detail were utterly plain.

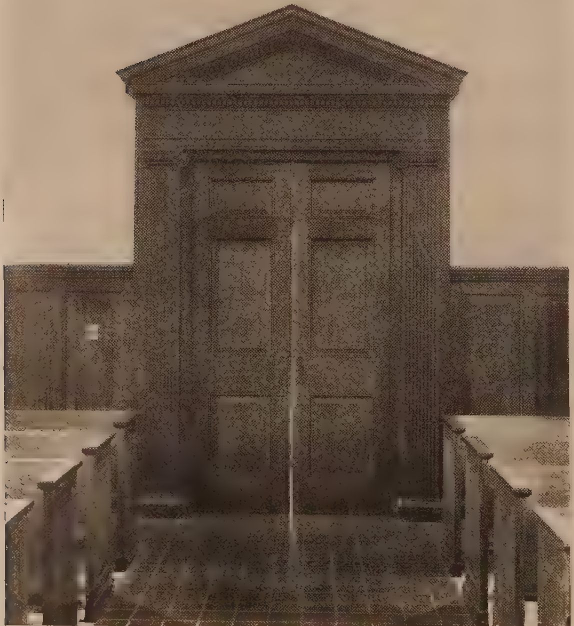
Such was the original building. In 1868 the vestry, with undoubted zeal but a point of view that reckoned not upon antiquities nor evidences of colonial piety, built at the centre of the north wall a wide apsidal chancel, with three narrow, round-arched windows. It must have been at this time that all the two-storied windows of the old church were run together into high, round-arched windows, reaching nearly to the ceiling, and the west doors abandoned in favor of an entrance at the centre of the south side. And later still an organ chamber and vestry were built upon the flanks of the chancel. Finally, in 1909, a memorial bell-tower went up on the south side. And so the building stood when the recent fire gutted it completely.

In rebuilding, most of the brickwork was found substantial enough, but the north wall, like the side walls of Old Swedes' in Philadelphia, had buckled decidedly in the centre, and was taken down. The changes that had come since 1776 had left their influence, and the sentiment for things as they had been in recent generations was found to be stronger than that for exact antiquarian reproduction of the older building of the eighteenth century.

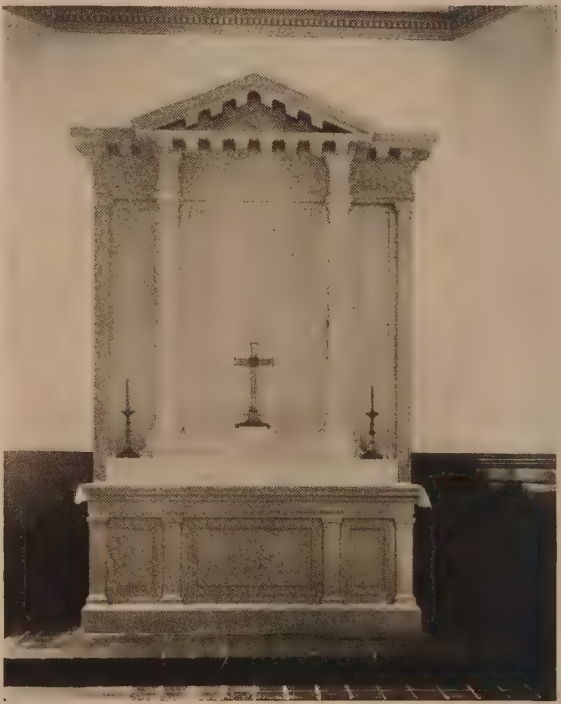
The result is a church with colonial motives but a form imposed by the evolution of a century and a half; it is a form upon whose masses and modelling each generation has left its stamp.



INTERIOR.



ENTRANCE DOOR.



ALTAR. Delos H. Smith, Architect.

ST. PAUL'S CHURCH, ROCK CREEK, DISTRICT OF COLUMBIA.

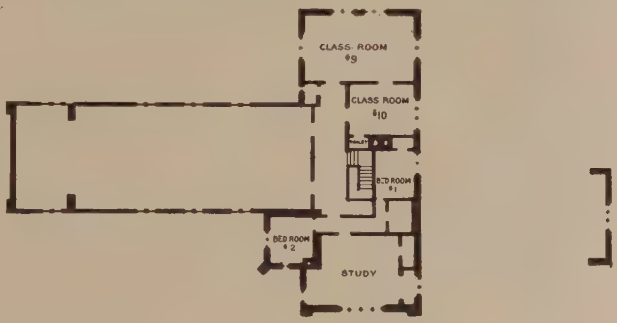
# Some Thoughts on Modern Sunday-School Buildings and Parish Houses

*By Hobart B. Upjohn*

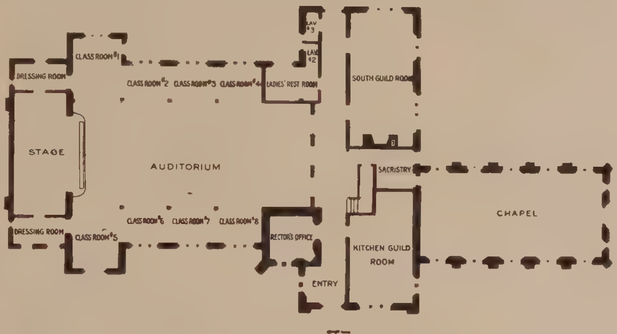
Detail, Parish House, Christ Church, Raleigh, N. C.

THE history of the Sunday-school movement has been varied in its progress from the original Sunday-school building as it was conceived in the years around 1870. The first Sunday-school rooms designed at this time were merely single rooms, a variant of the chapel, with classrooms provided by turning the seats into a box form. As time went on account of the distraction which was found in rooms of this type the elimination of the single open room was demanded, and the first great advance from this plan was the introduction of what was known as the "Akron Plan," a semicircular building, with the superintendent's desk at the centre of the circle and individual classes opening into the centre with their partitions arranged radially with folding doors, thus providing a number of classrooms which could be opened into the main Sunday-school room at the opening and the closing service.

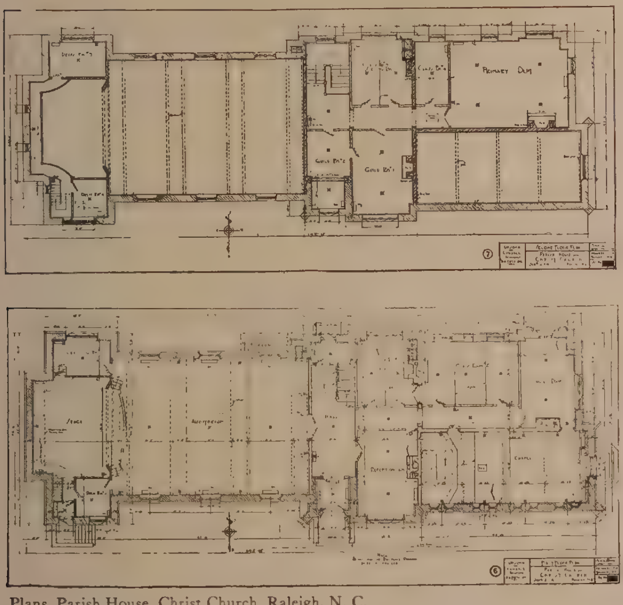
The Sunday-school movement, however, has advanced, and the general plan now recommended by the advisory boards of the Methodist, Baptist, and Presbyterian Churches, is what is now known as the "Departmental Plan." It is argued that since fifteen square feet are required per pupil for proper accommodation, that the Sunday-school can be divided into departments which are distinct units. These departments are provided with a central meeting-room and individual classrooms opening from this central meeting-room, but capable of being thrown into one large room. By this method the assembly-room of each department, by virtue of its seating, requires six square feet per sitting, and the individual rooms require nine square feet per pupil, thereby retaining the total as originally required, but gaining the advantage of cutting each department away from the next, and producing a building which is capable of entire elimination of the distraction which is so difficult a feature to overcome in teaching.



Second-floor plan.



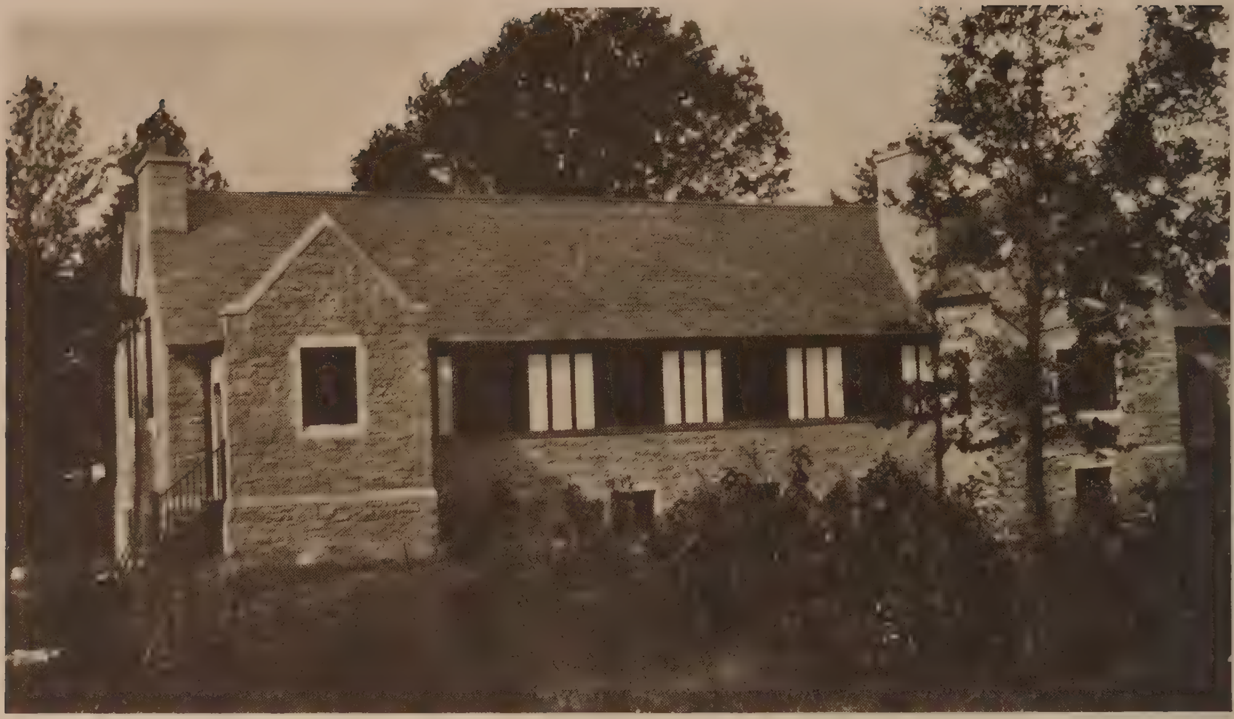
First-floor plan, Cheshire Memorial Parish House, Tarboro, N. C.

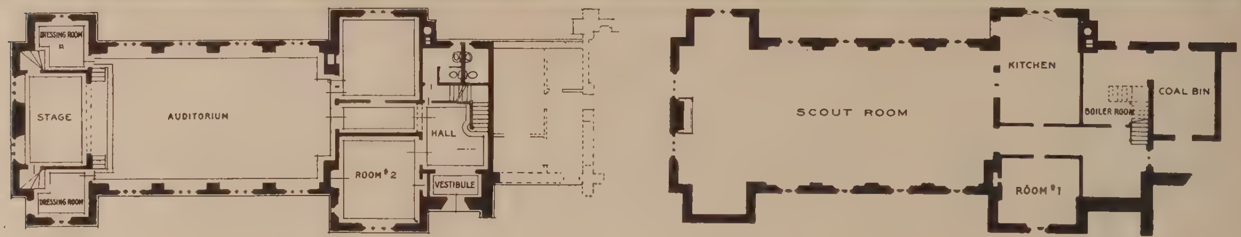


Plans, Parish House, Christ Church, Raleigh, N. C.

There has, however, been apparent a parallel movement going on at the same time. Churches are awakening to the fact that they must do their work on seven days a week instead of one; that their buildings must be designed to fit the uses of the weekday as well as Sunday. From this movement has grown an entirely different type of building.

The difficulty with the original Sunday-school was that a single large room was incapable of use except for Sunday-school purposes. Such a room is unusable for the meetings of guilds and other societies of the church in their work. This objection applies to the Akron plan. It has but one use, that of the Sunday-school, and can be used only for that purpose. The departmental school, which is the latest type, is open to the same objection, but to a lesser extent. The rooms may be used for other purposes than the Sunday-school alone, but it still is a very inflexible plan. Rooms that are devoted entirely to Sunday-school purposes, and especially the departmental school, are incapable of use for society rooms. In the work which is here shown





First floor. Second floor. Hobart B. Upjohn, Architect.

HOLY TRINITY PARISH HOUSE, GREENSBORO, N. C.

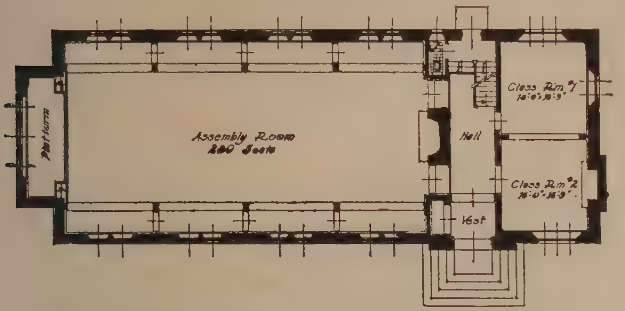
another principle is involved, which is that the building must solve the problem of the individual classroom and departments, but it must also solve the problem of the church work which goes on during the week.

Let us consider for a moment what these requirements are. In the first place the church houses are used to-day for the gathering of synods and church conventions. Similarly, the churches may invite speakers on civic or semi-civic subjects, and proper accommodations should be given to this class of work. They may wish to use their building for campaigns and they may wish to use it for more intimate purposes of general gatherings. This requirement dictates that there shall be a general assembly-room capable of seating perhaps the entire Sunday-school, or such other gatherings as may become a part of the church work. In the case of synods, where meetings are held all day, the main room should be left to the general meeting. There should be other rooms in the building capable of serving a lunch so that it is not necessary for those attending the synod to leave the building.

In cases of a reception, or the invitation to a noted speaker it adds materially to the force of the work if, after the speaking is done, a light supper is served. In cases where this is not a requirement, a reception of the special speaker is very often held privately before the actual ceremony. These requirements suggest the assembly-room, with a kitchen and a general reception-room capable of serving those attending a convention, but standing. This reception-room can be the general parish parlor or guild-room, and should be proportioned so that it may be used for small dinners, such as the individual church organizations. The kitchen also should be so located that it may serve a dinner to the entire parish in the assembly-room. These requirements bring out a certain flexibility of plan which is, in the opinion of the writer, a distinct advantage. The reception-room, on the other hand, has its distinct use in connection with the Sunday-school teaching, as will be shown later.

In addition to these requirements, individual rooms should be provided for the various church-working organizations. It stimulates the work of an organization tremendously if they feel that they have a central office which is capable of being furnished attractively and around which they may gather such memorabilia or pictures which distinctly relate to their work. It is not essential in the smaller parish houses to set aside rooms for one single society meeting once a week. The dual or treble use of a room of this kind is often accomplished by providing the room with closets, each guild having its closet to hold its particular work and equipment. The adoption of this principle, it will be easily seen, has the great advantage of adding a distinct interest among the body group for the work of the church.

We now come to the question of the Sunday-school building. Can the requirements of the school be so interlaced with the weekly use of the building that it will answer both purposes with full practicability? I believe it can. If we start with the Bible classes and the older classes and assign these to the reception-room, the guild-rooms, the rector's study, etc., we are taking care of the larger units of a class of students that will have respect for the rooms in which they meet. We now come to the younger classes, the juniors, intermediate, primary, and infant classes.



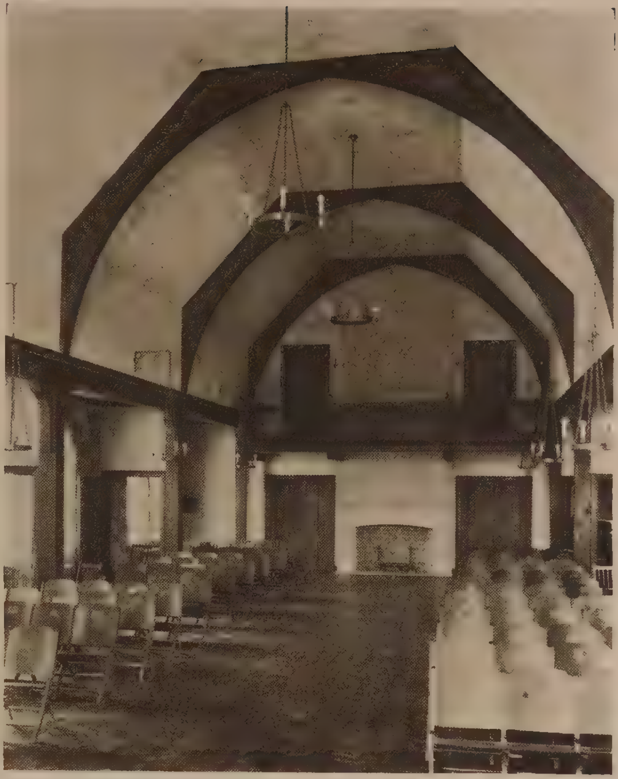
Plan, Parish House, St. James the Less, Scarsdale, N. Y. Hobart B. Upjohn, Architect.

With the juniors and the intermediate class, space can be provided of individual classrooms, using the auditorium for their assembly. The auditorium can be also used by the seniors and the Bible classes for their opening and closing service, in this way saving the necessity of individual assembly-rooms. For the beginners and primary departments, the writer believes that these should have a fully developed department of their own, with their own assembly.

Such a building is capable of every use that the work of the church may demand. I am leaving out for the present such work as a boys' club and gymnasium, which of course figure as an additional set of requirements in the modern parish house.

In the accompanying buildings this general idea has been foremost in the mind of the designer. It will be noted that the buildings are not developed to the full extent capable and described in this article. The ideal building is an extremely complex building and the question of cost is a large factor. In the choice between an extremely specialized building eliminating the weekly requirements of the building, or of letting the uses of the building in connection with the big work of the church dictate the plan, and then providing as many individual classrooms as possible, I believe the latter principle better for the strengthening of the church.

Such plans are shown in the parish house at Raleigh, the Cheshire Memorial Parish House in Tarboro, the Scarsdale Parish House, and Holy Trinity Parish House in Greensboro. It has been found in using these buildings that the weekly use has been tremendously stimulated; that the church has been able to get closer to the organizations of the city in which it is placed, even though they are not distinctly connected with the church, and it has been able to carry its message by personal contact to a better advantage than with a building without such accommodations. The parish house at Tarboro is probably the most complex of those shown. Here the sides of the main auditorium are capable of cutting off into individual classrooms and the larger rooms throughout the building are used for the various Bible classes and departments on Sunday. The kitchen is conveniently arranged to serve in the main auditorium and quarters are provided for the rector's assistants.



Assembly-room, Parish House, St. James the Less, Scarsdale, N. Y.

In the parish house at Scarsdale another system has been adopted of semienclosed classrooms around the auditorium. The large room on the second floor is used for the infant class and the large rooms on the first floor are used for the older classes. Such a plan is capable of development by the addition of a building at a later date as the church grows into a more highly organized Sunday-school, which building can be designed distinctly on the departmental plan.

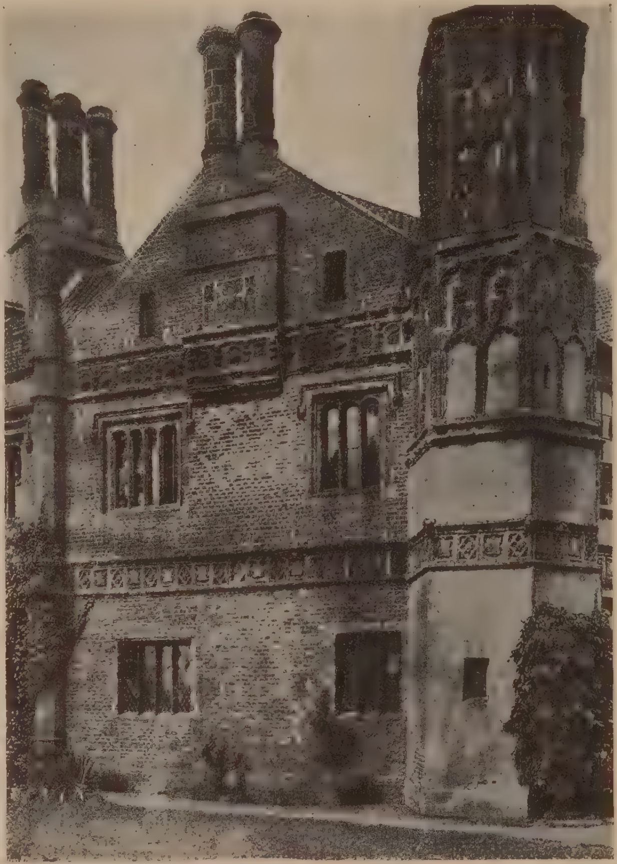
What, now, is to be the future of the parish house? The writer is convinced that the present method of Sunday-school teaching is inadequate. The small space of time given to instruction will never accomplish the purposes of the church. If we are to carry to the children a message of their responsibility to the world, and if we are to teach them the fundamentals for which their church stands, and why, it will never be accomplished in an hour's teaching once a week. It is in my opinion absolutely important that instruction in church matters should be handled on a more definite and businesslike basis, and that the period of instruction should be distinctly instruction. For this reason I believe that the Sunday-school building of the future will modify the present attitude of school designers; that the classrooms will be more distinctly classrooms, and as a policy the churches should adopt as free and flexible a building as it is possible to design in order that future modifications can be made without untold expense and rebuilding, which is the constant experience of the majority of churches. The church has little money to waste. It has many fields which should be developed, and it is the architect's duty to husband the resources as much as possible, that this waste in constantly rebuilding may be cut down.

# Book Reviews

LONDINIUM ARCHITECTURE AND THE CRAFTS. By W. R. Lethaby. With 175 figures. D. Appleton & Co., New York.

It is, as the author well says, "curious that Roman buildings and crafts in Britain have not before been studied as part of the story of the national art." The chapters deal with: Building Materials and Methods, Buildings and Streets, Walls, Gates, and Bridges, Cemeteries and Tombs, Some Larger Monuments, Sculpture, Mosaics, Wall Paintings and Marble Linings, Lettering and Inscriptions, The Crafts, Early Christian London, The Origin of London. The material included was published several years in the English magazine *The Builder*.

"The best way now to see again the old Roman City of London is to go to the foot of the hill below St. Magnus the Martyr and then, turning away from the riverside quays of the seaport, to walk up the street which still retains something of the look of a High Street in an old market town. Behind it we may still discern the ghost of the Roman Axis Street. Right and left are narrow streets with red plastered houses separated by little 'drangways.' Here at a corner is a small temple with a dedication to the deified emperor. There is the great City Bath. Farther on is the civic centre, the market-place and hall; one, a square piazza containing imperial statues in gilt bronze, and the other a big building having internal ranks of tall Corinthian columns, a wide apse, and an open timber roof—sombre but noble. Round about are many isolated and wide-spreading mansions, one doubtless being the palace of the governor of the province."



Great Snoring, Norfolk; south elevation of the old Shelton Manor House. From "English Homes—Early Tudor," Period II, Vol. I.

STANDARD PRACTICAL PLUMBING. By R. M. Starbuck. 432 (6 by 9) pages. 364 illustrations. Seventh revised edition. The Norman W. Henley Publishing Company, 2 West 45th Street, New York.

This book, which for years has been the standard authority on plumbing practice, has just been thoroughly revised and brought strictly up to date. Not only has the text been revised and many new engravings added, but considerable additional text, profusely illustrated, has also been added to the new edition.

While the book covers the entire range, it is especially strong in those chapters dealing with the practical work of the plumber, and therefore makes an especial appeal to those working at the trade or directing the work of others.

Much attention has been given to the treatment of practical problems in hot-water supply and circulation.

A new and special chapter on features of Government Plumbing, fully illustrated, has been added to this new edition.

STEEL AND TIMBER STRUCTURES. Compiled by a Staff of Specialists. Editors-in-Chief, George A. Hool, S.B., Consulting Engineer, Professor of Structural Engineering of the University of Wisconsin, and W. S. Kine, B. S., Professor of Structural Engineering of the University of Wisconsin. McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

The fifth in the series of six volumes designed to provide a complete work covering the design and construction of the principal kinds and types of modern civil-engineering structures.

In this volume fifteen specialists, each handling his own particular branch of the subject, cover every detail of steel and timber structures.

ENGLISH HOMES. PERIOD II, VOLUME I. EARLY TUDOR 1485–1558. By H. Avray Tipping, M.A., F.S.A. Charles Scribner's Sons, New York.

This new volume in this sumptuous and beautifully printed series of books on the best in traditional English architecture is in many respects one of the most interesting of the series. It deals with a period especially rich in country homes and with the blending of the later English Gothic with the new things derived from a growing fondness for the Italian Renaissance. Perpendicular Gothic is the prevailing style, but you see where the Renaissance influence is coming more and more to the front.

Above all the early Tudor period was the period of the English worker in wood, the day of the master carpenters and joiners, and with these hand in hand went the masons and bricklayers.

The beautiful old half-timbered houses, large and small, that are such fascinating lures for the traveller and especially for the architect or draftsman on a pilgrimage have proved a rich mine of suggestion for hundreds of houses in this country, and there are any number of picturesque and expensive American homes, "country estates," that have been derived from the Tudor, both with and without thanks.

It is a style that lends itself beautifully to various adaptations, and our skilful American practitioners have used the shell with plans that have made the places livable and equal to the demands of the very different social life of these modern days.

The Tudor house is with few exceptions "A right stately house embatayled and having a goodlye gate." The embattled walls, the intricate and picturesque array of chimney stacks, the ornamental finials, the charm of the varied brickwork, the trim of stone, and when you go inside the beautiful carved woodwork, the hewn beams, panelled walls, the great fireplaces with their arches or lintels of stone or oak, give an impression of stateliness and dignity, of a settled and substantial way of life.

The wealth of illustrations in these books, there are more than 480 in this particular volume, include not only many of the great as well as a number of smaller houses, but also a comprehensive showing of details, that make them invaluable references, even if you may not be interested in the personal and historical text that accompanies them.

Contents: Historical Introduction on Early Tudor Architecture—Boughton Malherbe, Kent—Buckden Old Palace, Huntingdonshire—Compton Wynyates, Warwickshire—Cowdray House, Sussex—East Barsham Manor House, Norfolk—Fawsley, Northamptonshire—Giffords Hall, Stoke-by-Nayland, Suffolk—Giffords Hall, Wickhambrook, Suffolk—Great Fulford, Devonshire—Hengrave Hall, Suffolk—Horham Hall, Essex—Lacock Abbey, Wiltshire—Layer Marney, Essex—Leez Priory, Essex—Lyddington Bede House, Rutlandshire—Muchelney Abbey, Somerset—Parham Old Hall, Suffolk—Paycocke's House, Essex—St. Osyth's Priory, Essex—Skipton Castle, Yorkshire—Sutton Place, Surrey—Thame Park, Oxfordshire—The Vyne, Hampshire—Thornbury Castle, Gloucestershire—Weare Giffard, Devonshire—Wenlock Abbey, Shropshire—West Stow Hall, Suffolk.

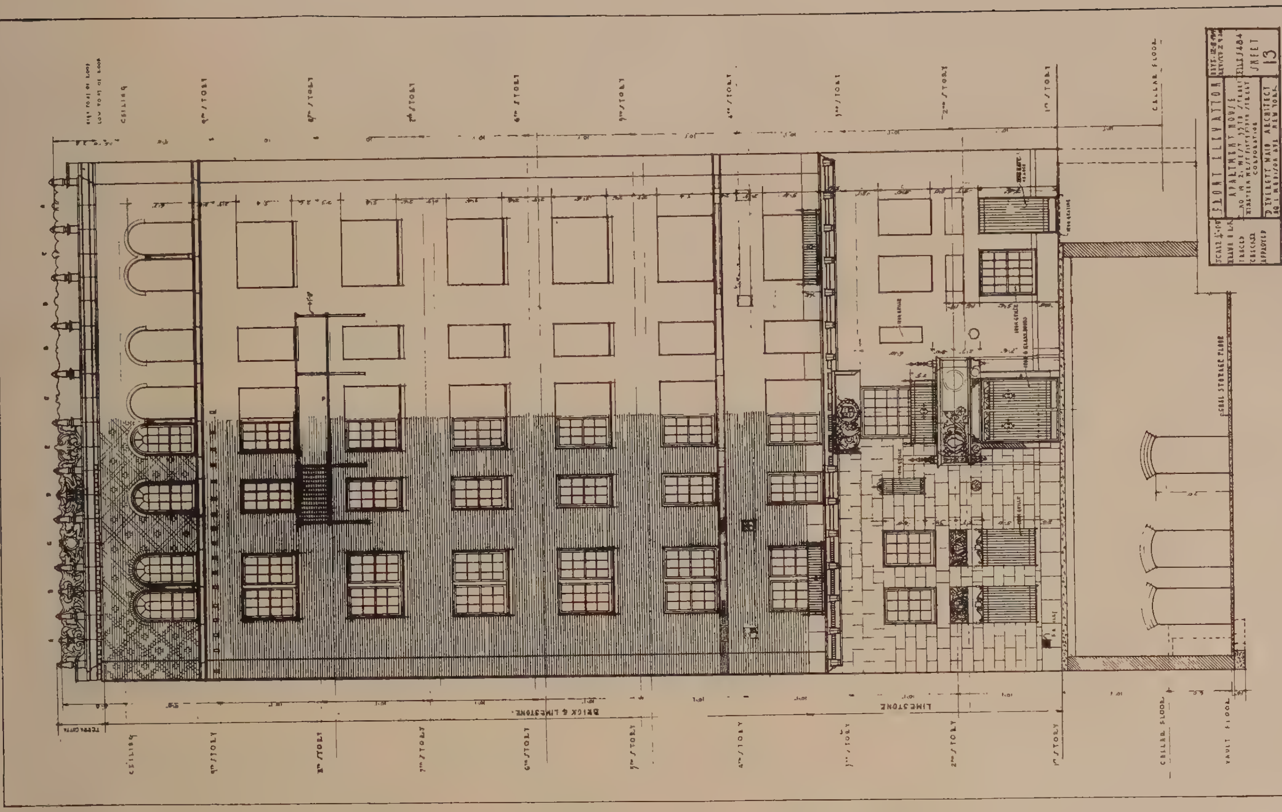
The other volumes in this series deal with Early Georgian, Late Tudor, and Early Stuart, Late Stuart, Late Georgian. They are uniform in size and price.

EARLY CONNECTICUT COLONIAL ARCHITECTURE. Measured Drawings with Full-Size Details of Moulded Sections Supplemented by Photographs. By J. Frederick Kelly, A.I.A. William Helburn, Inc., 418 Madison Avenue, New York.

Mr. Kelly has been making a study of Connecticut architecture for years, and there are few worth-while examples of the older work that he has not photographed and measured. As he says, Connecticut architecture is, in many ways, similar to the same period in the other American colonies, and yet there are noticeable certain differences and individual qualities. It is fortunate for lovers of this older architecture that we have such enthusiasts as Mr. Kelly, with his trained skill as an architect, to preserve, in his carefully made measured drawings, details that are fast passing away.

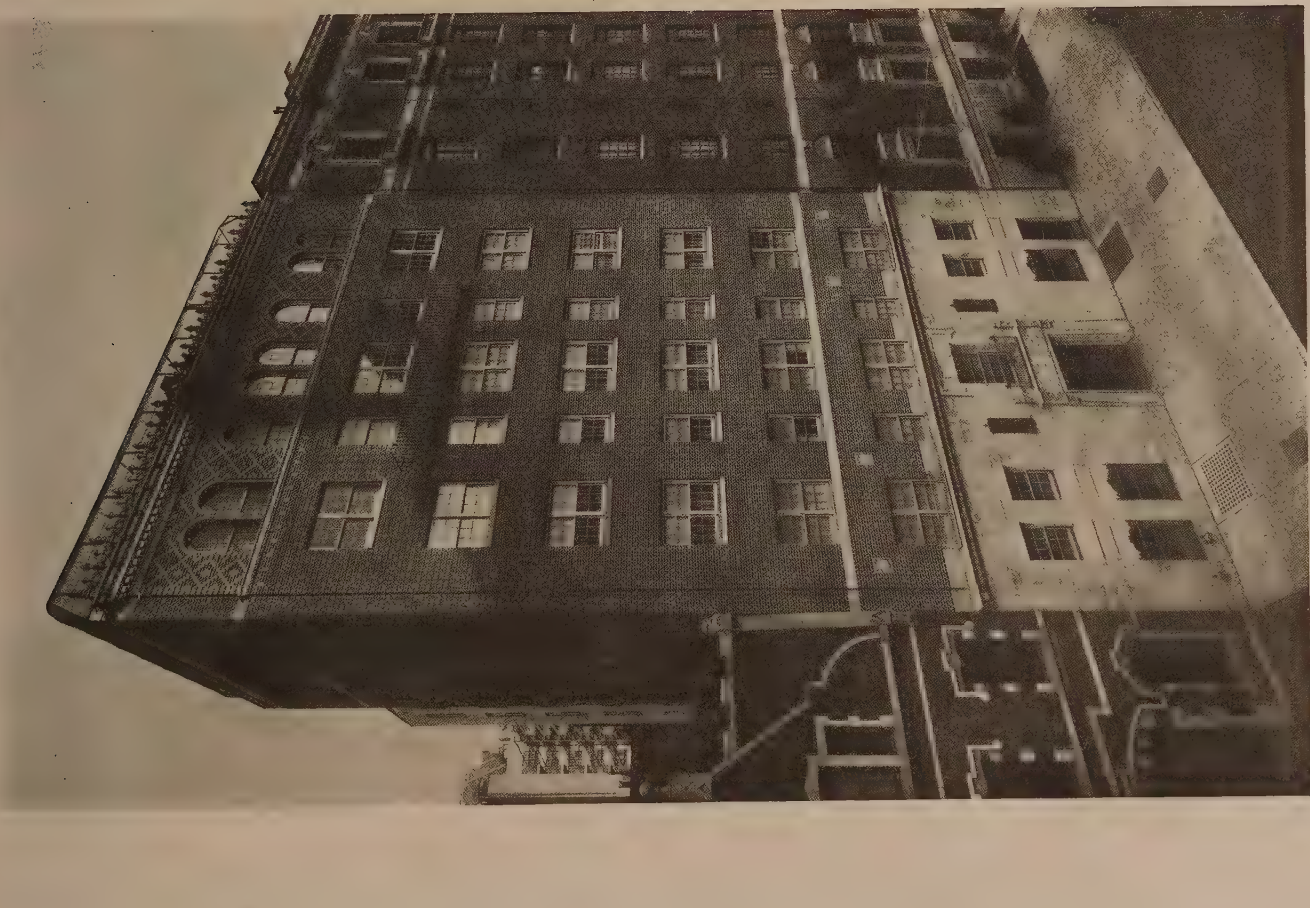
The subjects are well chosen and cover such details as stairs, mantels, windows, corner cupboards, doors, parlor panelling, etc.

The twenty-five large plates are printed on a heavy, coated paper and enclosed in an attractive portfolio cover.

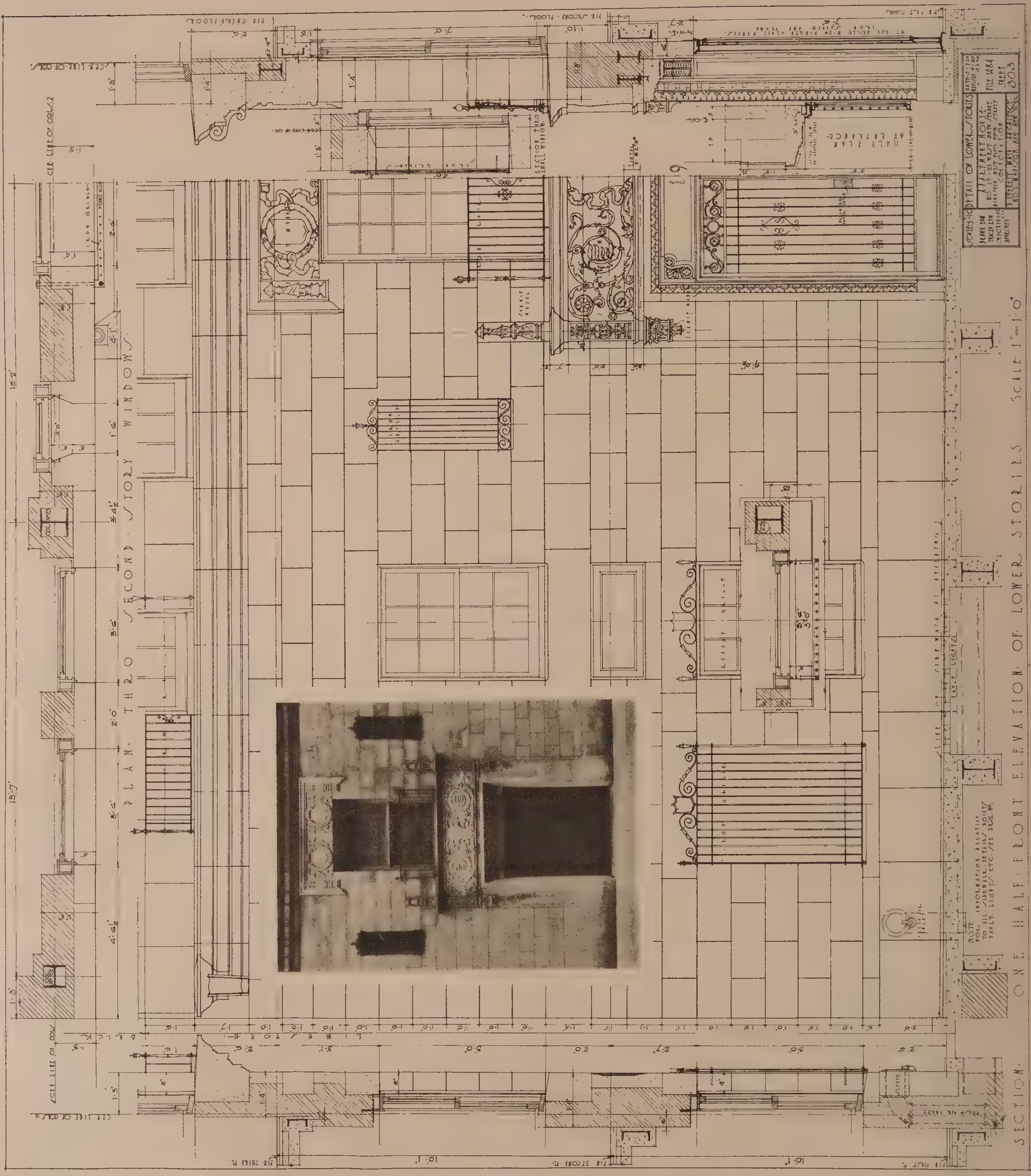


FRONT ELEVATION.

D. Everett Waid, Architect.



APARTMENT-HOUSE, 19 WEST 55TH STREET, NEW YORK.


ONE HALF FRONT ELEVATION OF LOWER STORIES
SCALE 1"=1'0"
PLAN THRO SECOND STORY WINDOWS
SECTION
HALF PLAN AT ENTRANCE
SECTION THRO SMALL WINDOW
DETAIL OF LOWER STORIES
APARTMENT HOUSE
NO 17-21 WEST 50TH STREET
NINETEEN WEST FIFTH STREET CORPORATION
D. EVERETT WAID ARCHITECT
NO 1 MADISON AVE NEW YORK
FILE 1484
SHEET 303
LIMESTONE
BRICK
CEN LINE OF COLS
FIN SECOND FLOOR
FIN THIRD FLOOR
FIN 1ST FLOOR
NOTE: INFORMATION RELATIVE TO ALL SIDEWALK, AREAS, VAULT, LIGHTS, ETC. SEE DWG. NO.
10'2"
15'7"
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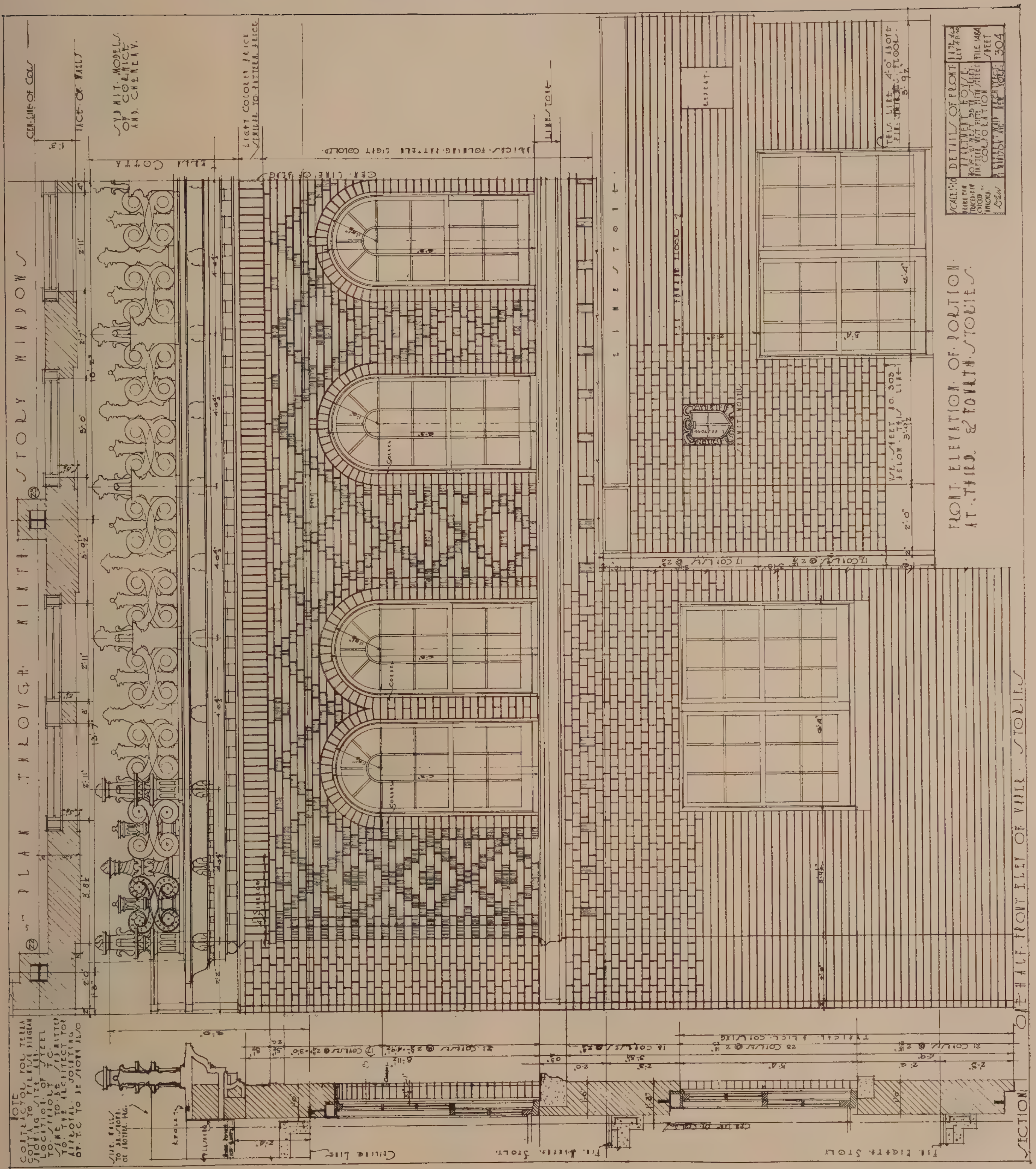

PLAN THROUGH NINTH STORY WINDOWS
FRONT ELEVATION OF PORTION AT THIRD & FOURTH STORIES
HALF FRONT ELEV OF UPPER STORIES
SECTION
DETAILS OF FRONT
APARTMENT HOUSE
CORPORATION
SCALE 1"=1'0
FILE 1484
SHEET 304
SUBMIT MODELS OF CORNICE AND CHIMNEY
TERRA COTTA
LIMESTONE
LIGHT COLORED BRICK SIMILAR TO PATTERN BRICK
CEN. LINE OF COL
FACE OF WALLS

# Construction of the Apartment-House

*By H. Vandervoort Walsh*

Instructor of Construction, School of Architecture, Columbia University, New York City

## ARTICLE XVI

### Fire-Proof Apartments' "Loose Ends"

SINCE the publication of these articles the writer has had interesting correspondence from manufacturers of various materials of construction either praising or condemning his statements. Much of this criticism has been very amusing, and some of it has been instructive. One of the most amusing letters we have received criticised us severely for poking fun at pressed sheet-metal cornices used in imitation of stone cornices. We were told that metal cornices were very fashionable with apartment-house builders, and we had no right to comment so flippantly on them.

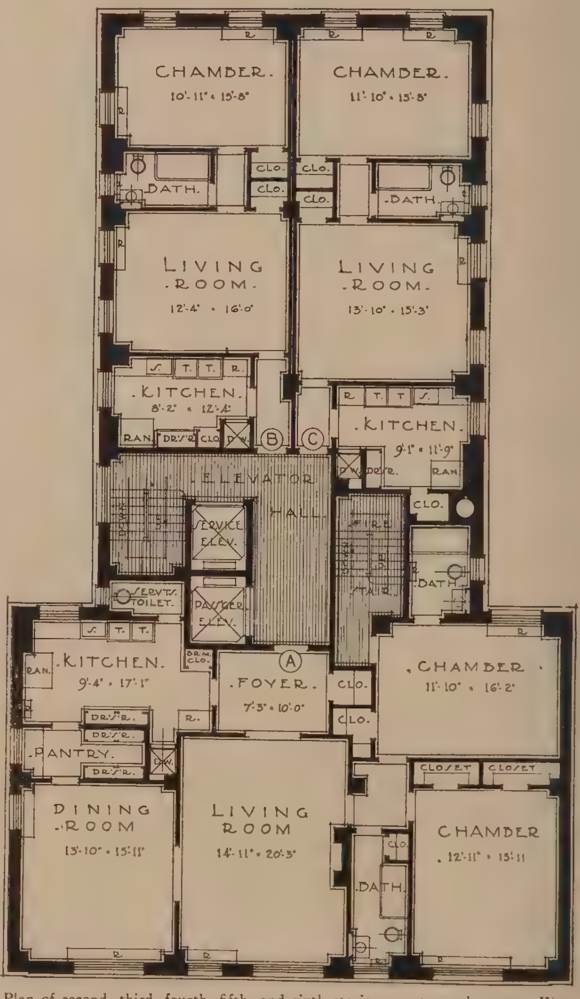
Other criticism has been instructive, and we are going to give space here to some of the important points brought out in this correspondence. In Article IV we showed a diagram of a brick bearing-wall having 4-inch ashlar facing bonded into the backing by *metal anchors*, and we stated that the ashlar could not be counted in with the wall thickness. We are informed by the limestone interests that in the new code, now being prepared under Secretary Hoover, this ashlar will be permitted to be counted in with the thickness of the wall.

Another very excellent comment was recently made, that this series of articles dealt mostly with the type of construction used in New York City. We plead guilty to this, and we wish to emphasize the fact, so that our readers will know definitely that we are writing from observations made around New York City, where there are being erected some of the largest and finest apartments in the country. But apparently this fact disturbs some readers, for after we had described the floors of reinforced, cinder-concrete slab construction, we received the following comment: "If the builder of a high-grade apartment in the Mid-west should happen to read your article, he very naturally would feel that reinforced concrete is the only material that New York, our metropolis, has found satisfactory, and very naturally he will assume that New York knows just a little more about it than the smaller city in which he is located."

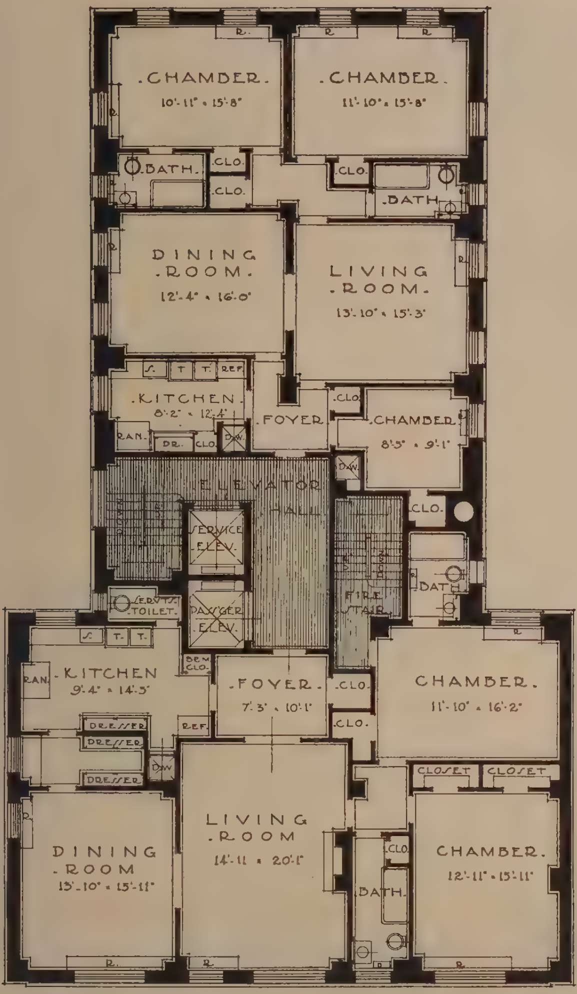
The same writer says that the floor construction of the majority of apartments in other parts of the country is not of reinforced-concrete construction, but that many of them have structural-steel frames with other types of floor construction, and many involve steel tile or other concrete combinations, and again many of them are steel lumber. Continuing, he states that he is aware that metal lumber is not used in the biggest and finest apartments in New York City, and that it is probably true that the largest and the greatest number of apartments are erected in this city, but he cannot see that size or number or elaboration of interiors has anything to do with the selection of floor construction.

Let me quote him directly: "Even though you do not find steel lumber used in fire-proof apartments around New York, does not necessarily condemn a worthy material, and again, I am prompted to feel that you have unconsciously assumed that steel lumber is a material just a little better than wood joists, and that it is merely a metal substitute for wood. This is not an uncommon impression, and we can tell you candidly that there are many architects who, fifteen or sixteen years ago, when steel lumber first appeared, seemed to have quickly classified the material as a little too expensive for a frame building and a little too poor for a good building."

Now, in order to be perfectly fair in the matter, we wrote to the manufacturers asking why no tests on the fire-proof qualities of this floor construction had been made by the Underwriters' Laboratories, and we were told that this was not the fault of the manufacturers. They said the Bureau of Standards was not equipped to make tests on fire-proof construction as yet, and that they had been after the underwriters for some time, and that there is no ques-



Plan of second, third, fourth, fifth, and sixth stories, apartment-house, 19 West 55th Street, New York. D. Everett Waid, Architect.



Plan of seventh story, apartment-house, 19 West 55th Street, New York. D. Everett Waid, Architect.

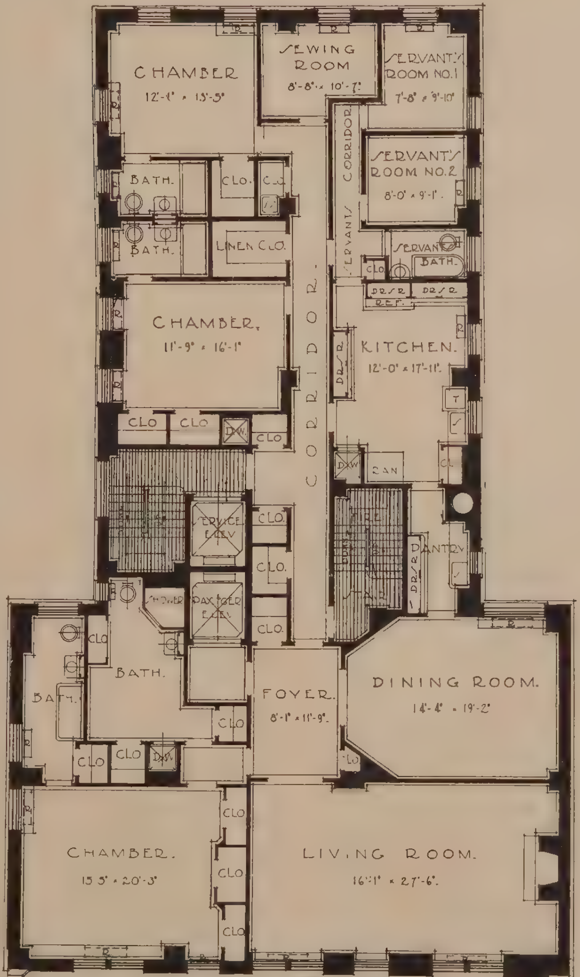
tion that a test on this floor construction would be made some time this summer. In addition, they state that the Ohio Board of Building Standards had, on March 5, 1924, passed standard steel-lumber construction on a par with other fire-proof constructions, prescribed by the State Code.

In Article XIII we made the statement that this type of floor was not accepted by the building codes as fire-proof. We referred here, of course, to the majority of building codes of the largest cities, and incidentally had in mind the recommended code of the National Board of Fire Underwriters, which has had much influence on the formation of building codes. But perhaps we should modify this statement, after this criticism, by calling attention to the acceptance of this floor construction in fire-proof apartments by the building codes of Pittsburgh, Cleveland, Minneapolis, San Francisco, and New Haven. Even in New York the superintendent of buildings has permitted this material to be used in order to allow the requirements of the State Tenement House Law to take precedence over the Building Code, although the Building Code itself does not recognize the floor as fire-proof.

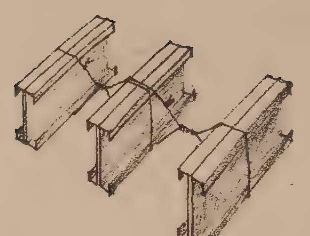
We received other interesting criticism concerning our descriptions of the building of fire-proof partition in apartment-houses. If the reader will recall Article XII on the subject of partitions, he will notice that we laid emphasis upon the fact that the partitions between the rooms of housekeeping apartments were built of gypsum blocks, whereas those in hotel apartments were built solid of metal lath and plaster to save floor space. Here again we were referring to observations made mostly around New York, and these observations, we can assure the reader, are correct, but because of our statements of the matter in this manner it seems to one of our critics that we are advocating the use of gypsum blocks in preference to solid plaster partitions on metal lath. This is a matter of controversy that we do not wish to enter, and therefore we warn the reader that because it is the custom, in New York City, to build fire-proof partitions of gypsum blocks, it is not a condemnation of other types of partitions for other sections of the country. Solid plaster partitions on metal lath are recognized by the building codes on the same basis as other fire-proof partitions.

Our critic says that the selection of partitions is much a question of habit, or possibly, on account of lack of familiarity with the construction of solid plaster partition on the part of apartment-builders, that these partitions are comparatively new and have not been pushed as vigorously as other materials have been pushed for this purpose.

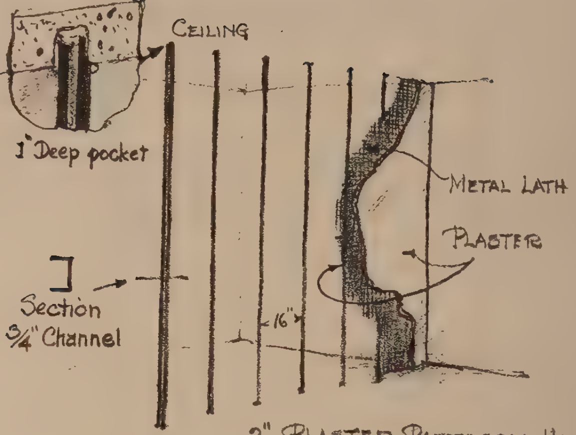
We made another statement concerning solid plaster partitions—that they had shown enough failures in tests to cause a difference of opinion among authorities as to their fire-proof qualities. By making even this statement we have gotten ourselves into the controversy, and we wish to beg off, and ask the reader to accept solid plaster partitions,



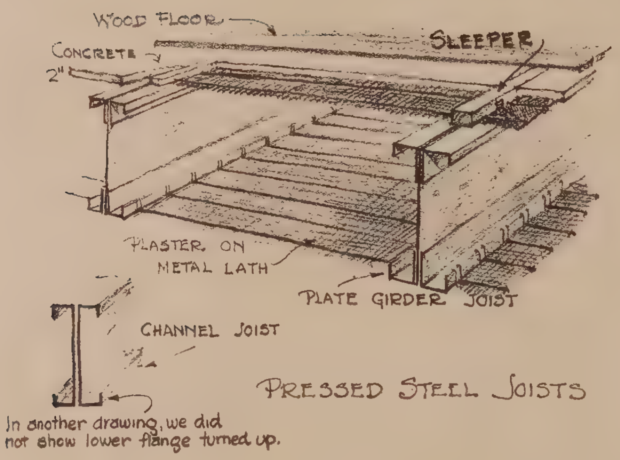
Plan of eighth story, apartment-house, 19 West 55th Street, New York. D. Everett Waid, Architect.



WIRE BRIDGING FOR STEEL JOISTS.

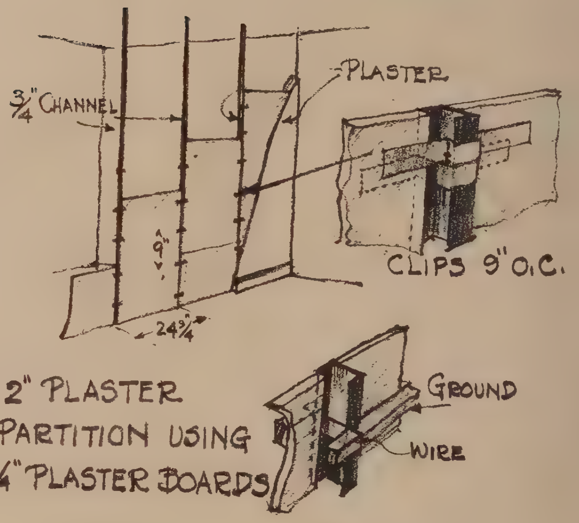


2" PLASTER PARTITION USING METAL LATH



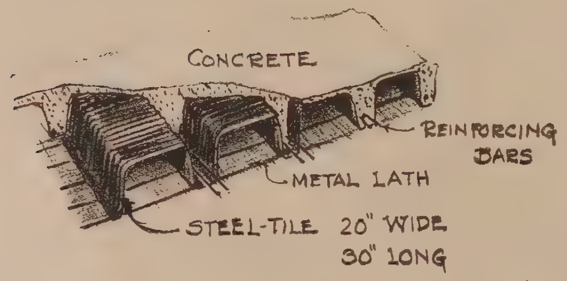
In another drawing, we did not show lower flange turned up.

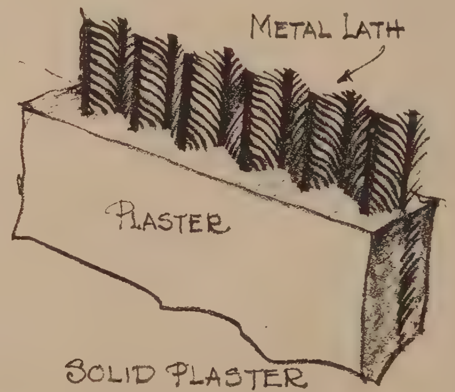
PRESSED STEEL JOISTS



2" PLASTER PARTITION USING 1/4" PLASTER BOARDS

THIS PARTITION REQUIRES NO REINFORCING STUDS





SOLID PLASTER PARTITION

as do the building codes, as quite satisfactory fire-proof partitions.

Then to our surprise we got another letter calling us to task for our statement that *hollow clay tiles* were used around *stair-wells and elevator-shafts* and *interior columns in preference to gypsum blocks*, although the latter, we had stated, were used between the various rooms. And yet we can assure the reader that we have seen that very thing in most of the new fire-proof apartments going up in New York City. Indeed, we have a dozen or more photographs to prove the record of our senses. We had always been under the impression that the reason for this change of materials was a requirement of the law, based upon tests. When we received this letter we immediately went to the telephone and called up a number of well-known architects who are specialists in apartment-houses and asked the specification-writers why they used hollow clay tile around elevator-shafts and stair-wells, instead of the gypsum blocks that they used in the rest of the building. In every case we received the answer that it was the law. Well, there we were, our observations were confirmed. However, we did not rest with that, but got in touch with the Building Department, and set a few inquiries at work there concerning the law. Much to our surprise, we got the answer back that the law was not interpreted to require hollow clay tiles in preference to gypsum blocks around elevator and stair shafts. We were informed by certain members of the Building Department that the architects evidently made this distinction because they believed hollow clay tiles were better for this purpose. And so we stand convicted of the sin of having seen something that is *believed by the builders of apartments to be required by law*, and yet *which is not required by the guardians of the law*.

But the worst we have gotten into, so far, is that which has to do with sound. Like other mortals in the architectural profession, we were brought up on the idea that when we wanted a sound-proof partition the way to get it was to use air. In all of the apartments we have observed, whenever a sound-proof partition is desired between apartments, it is built double, with an air space between. If such an air space was not available, then air-cells were used, by the introduction into the partition of a hair quilt or one made of eel-grass. Indeed, it has been our impression, as it is the impression of many in the building line, that even a hollow-block partition in which there are air-cells is more sound-proof than one which is solid. In fact, we have often noticed the sound-reverberating properties of some solid plaster partition, and remarked on how much more so it was than that of hollow-block partitions. Then we were brought up on the tests that had been made by different investigators on this matter of sound transmission, in which test the experiences of our senses were justified. We had read, it is true, Professor Watson's experiments along these lines, which showed that solid-plaster partitions were more sound-proof than hollow-block partitions, but had not taken them very seriously, for they did not seem to match up with our own experience, and we considered them to be laboratory tests which did not resemble actual conditions in the building. But now we have these tests flung at us, to prove how wrong was our statement that solid plaster partitions were not as sound-proof as hollow gypsum-block partitions. We hardly got through reading the letter when we received another from the makers of gypsum blocks, calling us to task for saying that there was *not much difference* between the sound-proof qualities of gypsum-block partitions and hollow clay-tile partitions, for, as the manufacturers of these blocks said, we have tests that prove this is not true, but that gypsum-block partitions are *much more sound-proof than hollow clay tiles*. Of course our own experience has been that in apartment-houses one cannot distinguish between the sound-proof properties of the two partitions, but then the senses are crude.

You see, Professor Watson in his tests used machinery with no imagination connected with it, and he came to the conclusion that the sound-resistive value of a solid partition depends upon the inertia of that partition or its ability to resist sound vibration. We are told that the trouble with the solid-plaster partitions, that we had noted to be good sound-transmitters, was that the reinforcement was slack, such as a wire-lath partition might afford if not properly erected, and thus the partition responded more freely to the vibrations. In other words, unless a solid-plaster partition is built with absolutely tight internal reinforcements, it does not necessarily show superior sound-resisting qualities. Of course, every one who knows anything about building will recognize that the careful workmanship on the erection of the reinforcements of such a partition that would be possible for a laboratory test, is not obtainable in a building that is going up with all speed. The makers of metal lath claim, of course, that this is possible with their materials, but not necessarily with wire lath.

Thus, as the matter stands, on the present count, the manufacturers claim that solid-plaster partitions are more sound-proof than hollow gypsum-block partitions, and they can show tests to prove their claim, and then the makers of gypsum-blocks claim that their partition is more sound-proof than hollow clay tile, and can show tests to prove their claims. We leave the matter with the reader for his judgment, but we wish to emphasize that we stand ready to consider any other criticisms of our statements that may seem to be misleading, for we are dealing with a growing, changing, and living subject.

(*To be continued.*)

## Book Reviews

PLUMBING QUESTIONS AND ANSWERS ON THE NEW YORK CITY RULES AND REGULATIONS. Useful Information for Plumbers, Architects, Estimators, Masters, Inspectors, and Draftsmen. By Joseph E. Taggart, S.E. Second Edition. U. P. C. Book Co., Inc., 239 West 39th Street, New York.

This is a useful and helpful little book containing a great deal of practical information stated in definite terms. It makes clear the Plumbing Code of New York City, and the measures contributing to strict sanitary regulations.

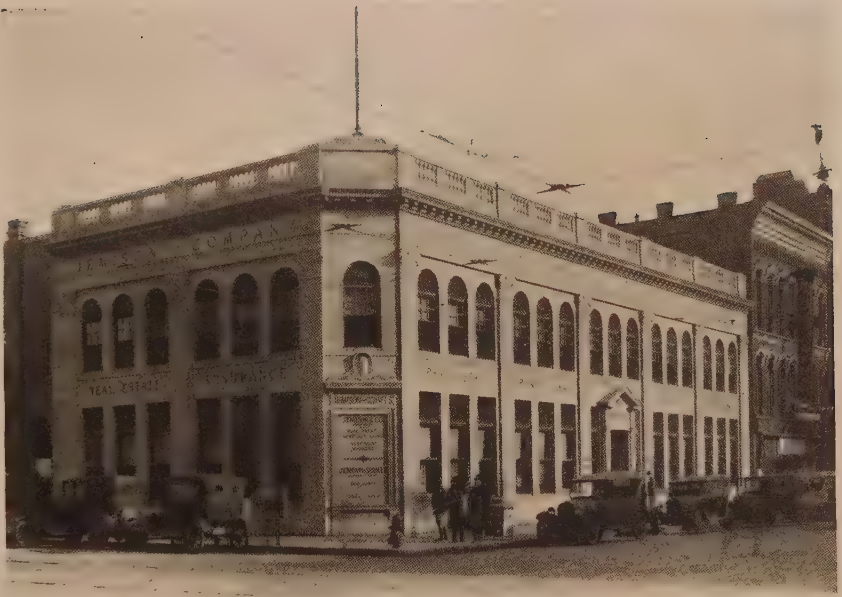
ORIGIN OF CHRISTIAN CHURCH ART. New Facts and Principles of Research. By Josef Strzygowski. Eight Lectures delivered for the Olaus-Petri Foundation at Upsala, to which is added a chapter on Christian Art in Britain. Translated from the German by O. M. Dalton and H. J. Braunholtz. Oxford University Press, American Branch.

Here are made accessible to American readers in their present formulation the theories of the great protagonist of the Eastern hypothesis, who for a quarter of a century has been steadily pushing back the frontier of research in the Near East. His enunciation of the decisive influence of the Orient in the evolution of Roman, Early Christian, and Byzantine art has now long been accepted, and the conclusions of his early books, which trace this influence to Alexandria, Syria, and Asia Minor, have become common property. Since then, however, Strzygowski has followed it to sources farther East: to Mesopotamia under the Parthian Empire and to Iran under the New-Persian or Sassanian dynasty.

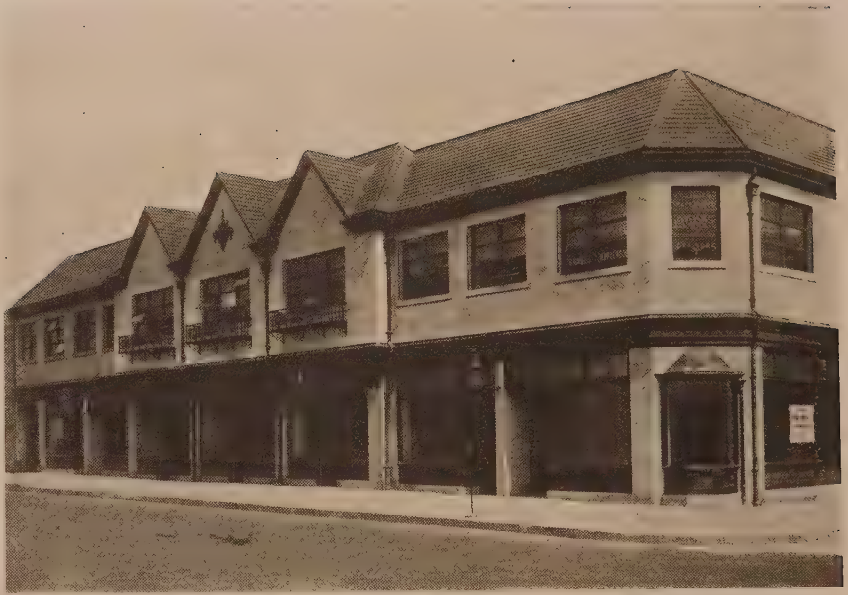
He contends it was in this region that were developed the dome with surrounding niches, as in the "Temple of Minerva Medica" or the Villa of Hadrian; the dome over a square plan, as in Byzantine architecture; he points out that here Christianity was tolerated and church edifices, many of them vaulted, were erected long before the churches of Constantine in Rome. It was from here, he contends, that all the elements of progress that transformed the timber-roofed basilica came; which, carried westward from Asia by the Teutonic invaders of Europe, were responsible for the tri-apsidal churches of Cologne and the domed churches of Perigord, as well as those of Byzantium.

Far more revolutionary still are the broader aspects of his new synthesis: that instead of a division into East and West we should make our primary division between an Aryan North, embracing Iranian and Teuton, and a Semitic South, of Egypt and Mesopotamia; that Gothic art is to be considered not so much an evolution from the Mediterranean basilica as from a primitive wood construction of the Northern peoples still surviving in Scandinavia; that Western Gothic was long anticipated by the Armenian branch from the same Northern stem; that Northern and Christian art was initially and essentially non-representational; that the Aryan Greeks thus must be conceived as having sold their birthright to Semitic representative art; and that the North sold its own to the Semitized Mediterranean at the Renaissance.

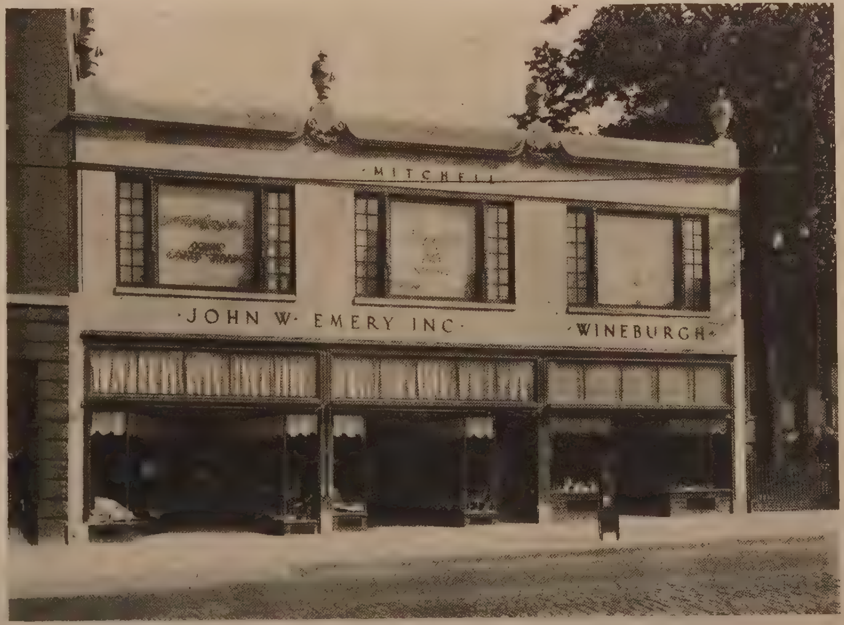
To establish all this, no wonder the author has to make onslaughts on merely documentary methods of historical research, to inveigh against depending on the accidental survival of existing monuments, to establish a principle of "essential character" and congruity with the spirit of development, to justify necessary assumptions. No wonder, too, that his opponents decry his method and results as fantastic, attack his early dating of crucial works, and refuse to follow him beyond his conclusions of 1903. But, as in 1903 they equally refused to follow him at all, will they not, he asks, accept his present position in 1943?



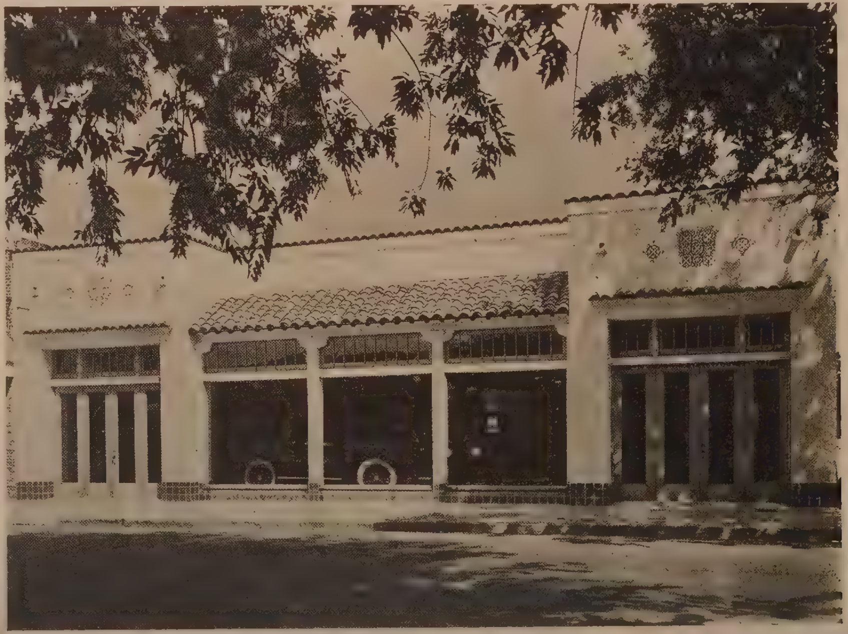
Real-estate offices, Jemison Co., Birmingham, Ala. Warren, Knight & Davis, Architects.



Estee Building, Brick Church Plaza, East Orange, N. J. Williams & Barratt, Architects. Built at 34 cents a cubic foot, amounting to $60,000. The exterior is limestone and portland cement stucco, with copper roof.

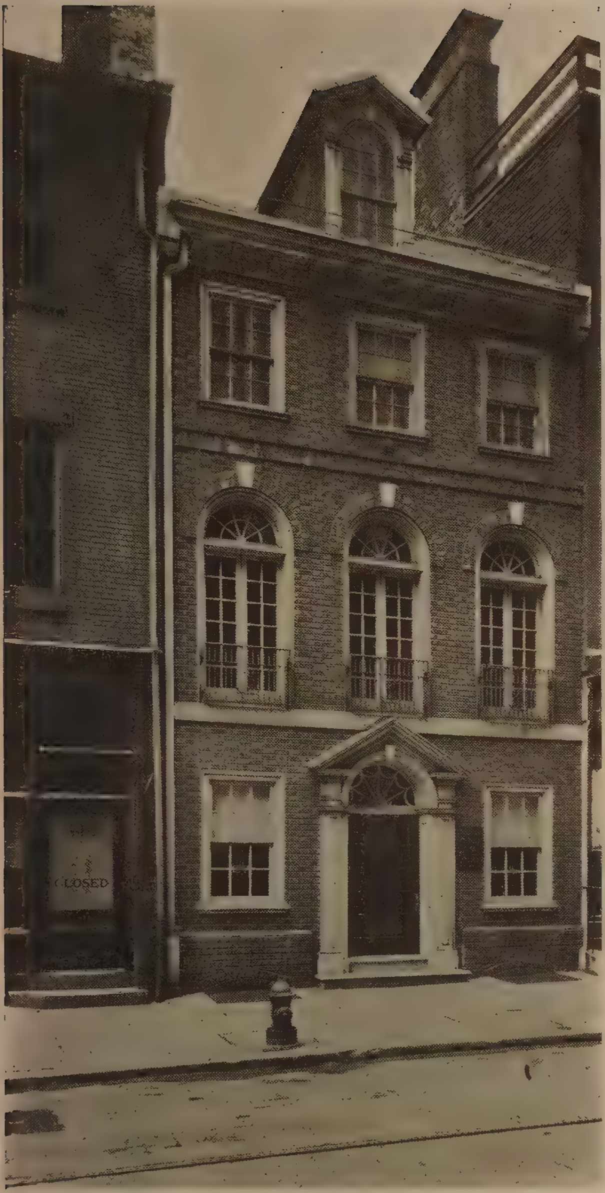


Small business building, Utica, N. Y. Bagg & Newkirk, Architects.

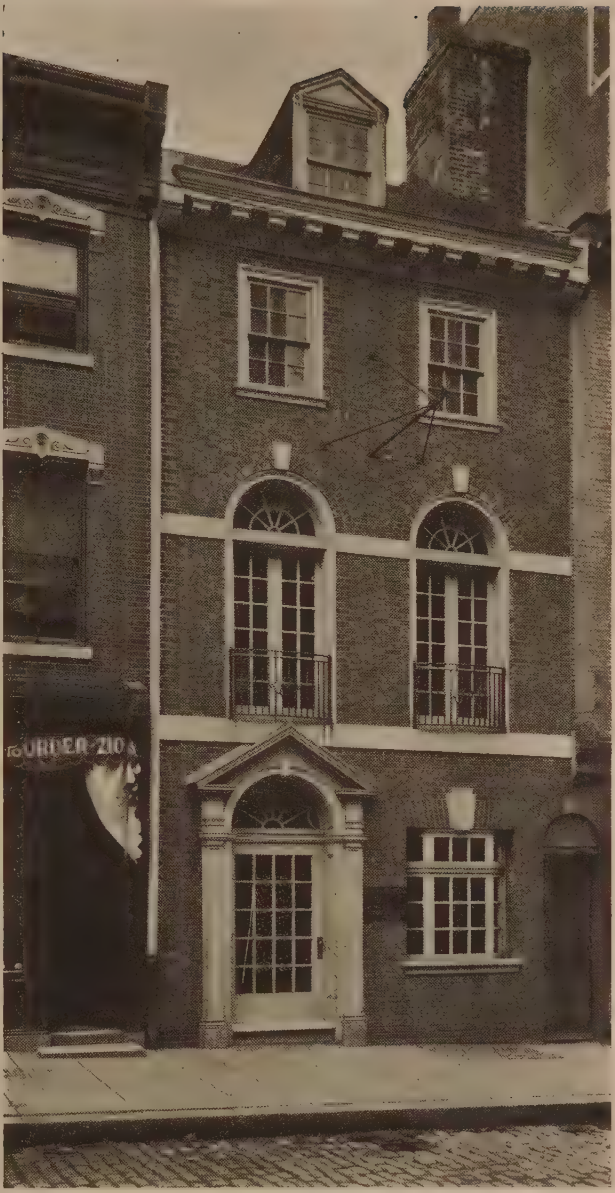


Automobile display room, Jack W. Neal, San Antonio, Texas. Atlee B. Ayres, Robt. M. Ayres, Architects.

SMALL BUSINESS BUILDINGS.



Cotton-brokers' offices, 132 South 41st Street, Philadelphia. Carl A. Zeigler, Architect. Before alteration this was of similar type to adjoining buildings.

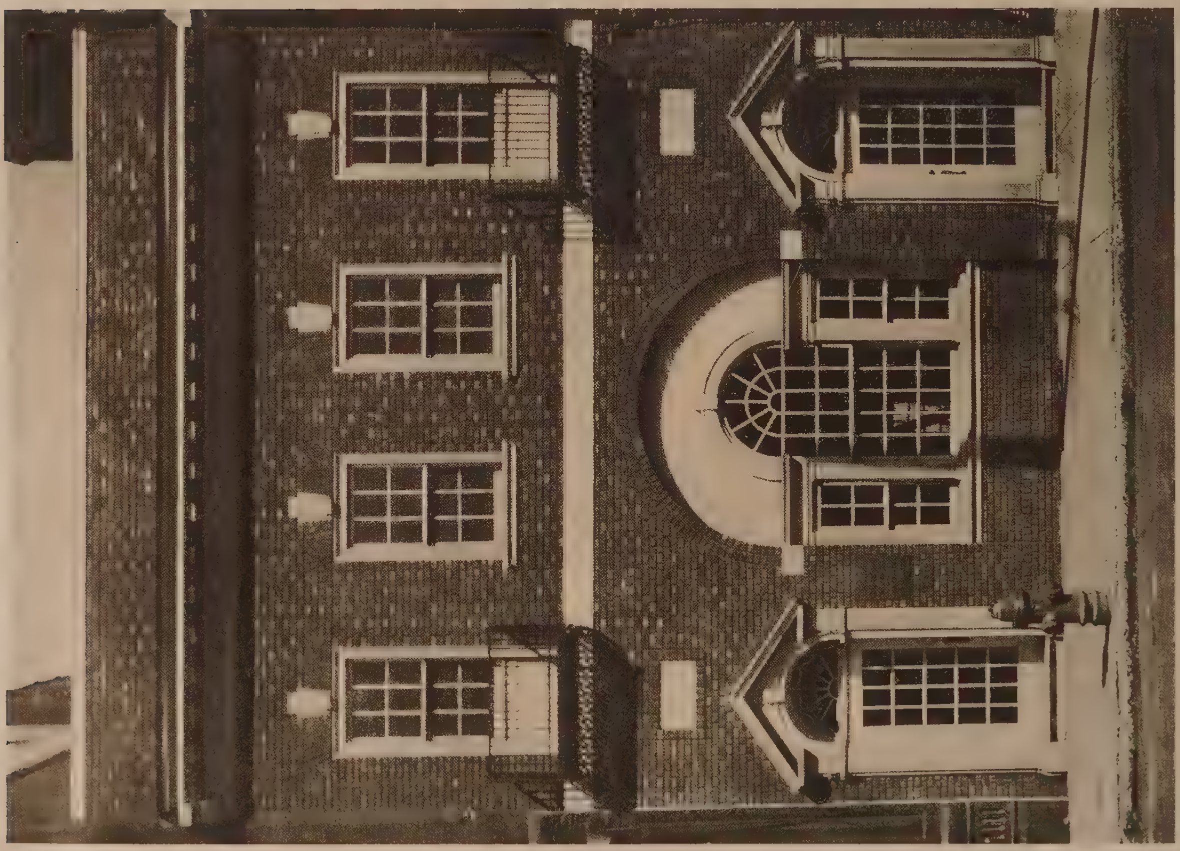


Insurance-company office-building, 201 South 3d Street, Philadelphia. Carl A. Zeigler, Architect. This building was originally like the one to the left.

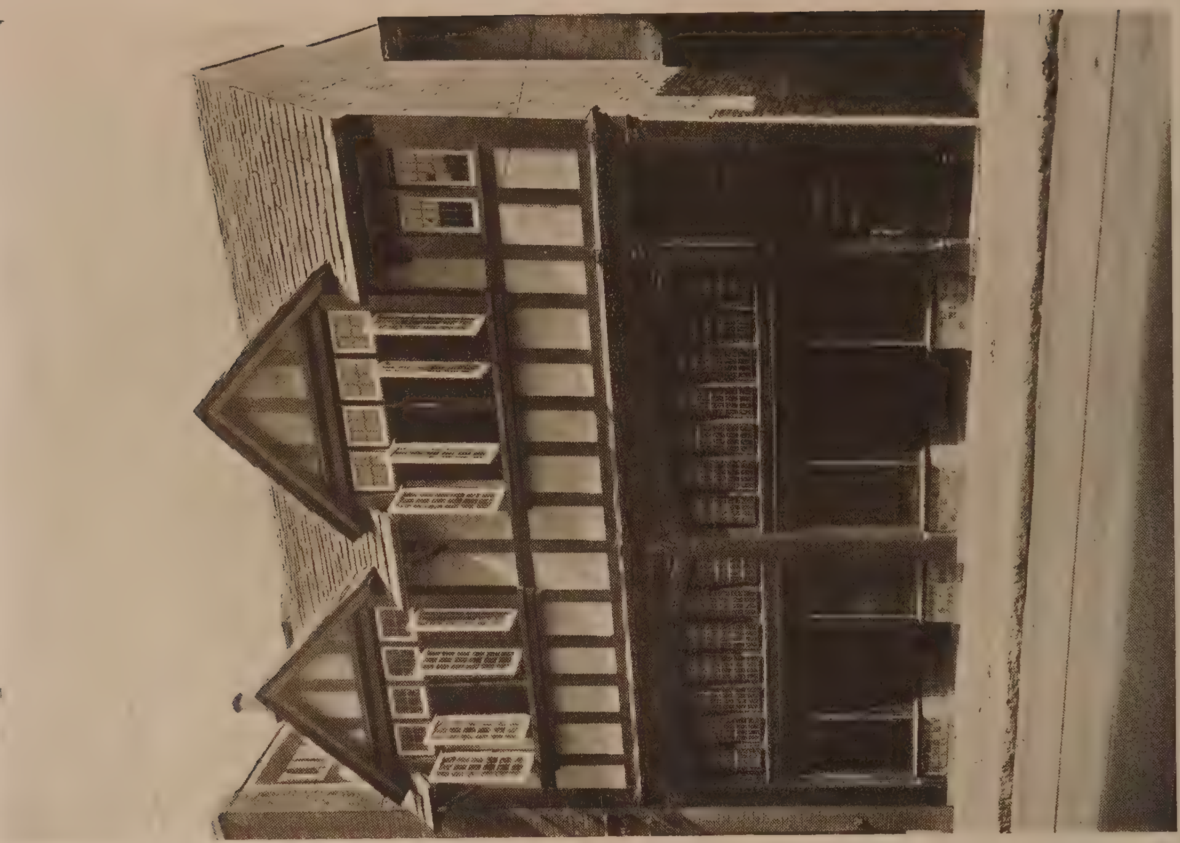
## Alteration of City Buildings

THE photographs of stores and office-buildings illustrate what may be done with some of the hideous commercial buildings that line our city streets. The high cost of building makes it imperative to salvage as much of the old construcure as possible and in these buildings very little was done with the interior other than renewing the floors and painting all the walls and ceilings. In every case the real-estate value of the property was increased far beyond what might have been expected with such a small expenditure.

The building on Chestnut Street, Louisville, Kentucky, is designed after the English "half-timber" type so common in Chester, England. The timber work shows the marks of the tool, and there is a pleasing texture to the plastering between the timbers. The roof is of graduated slate, varying in size and color.

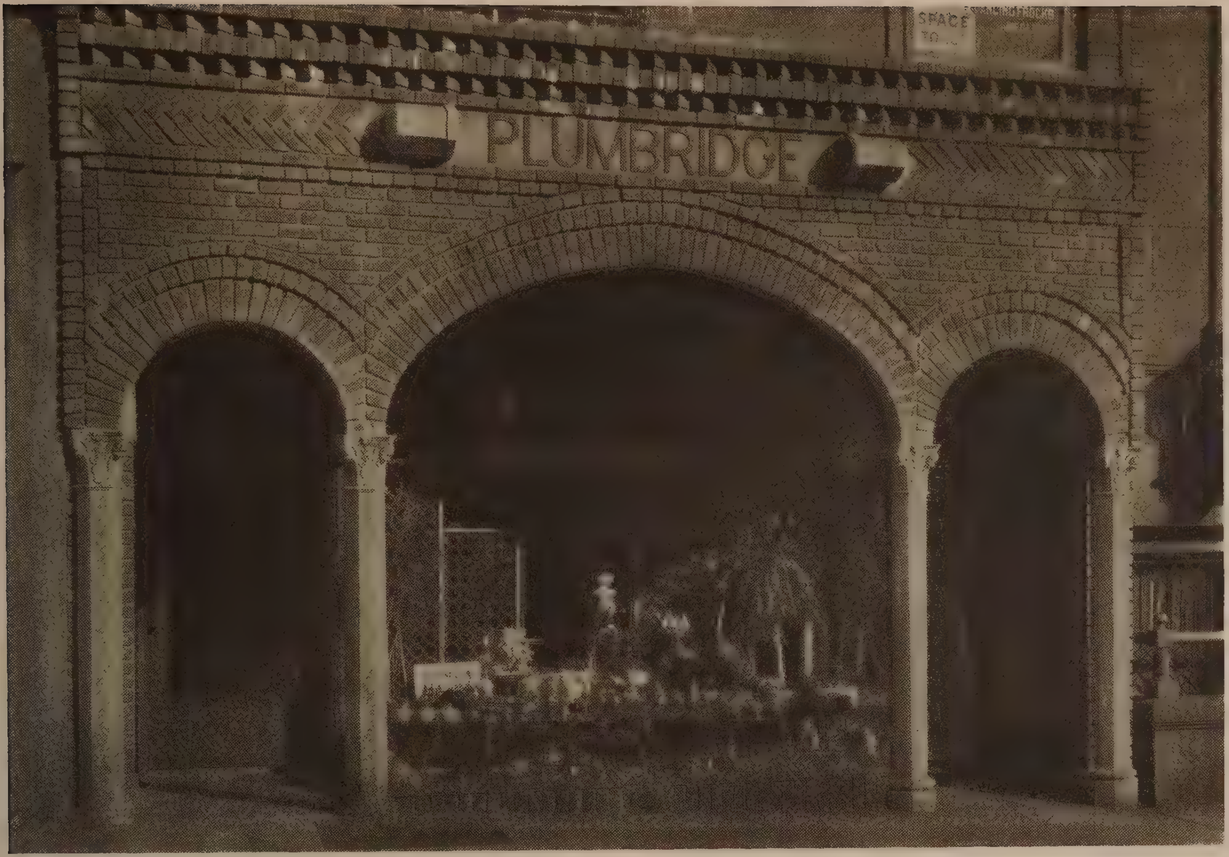


Building on Jefferson Street, Louisville, Ky. Carl A. Zeigler, Architect.

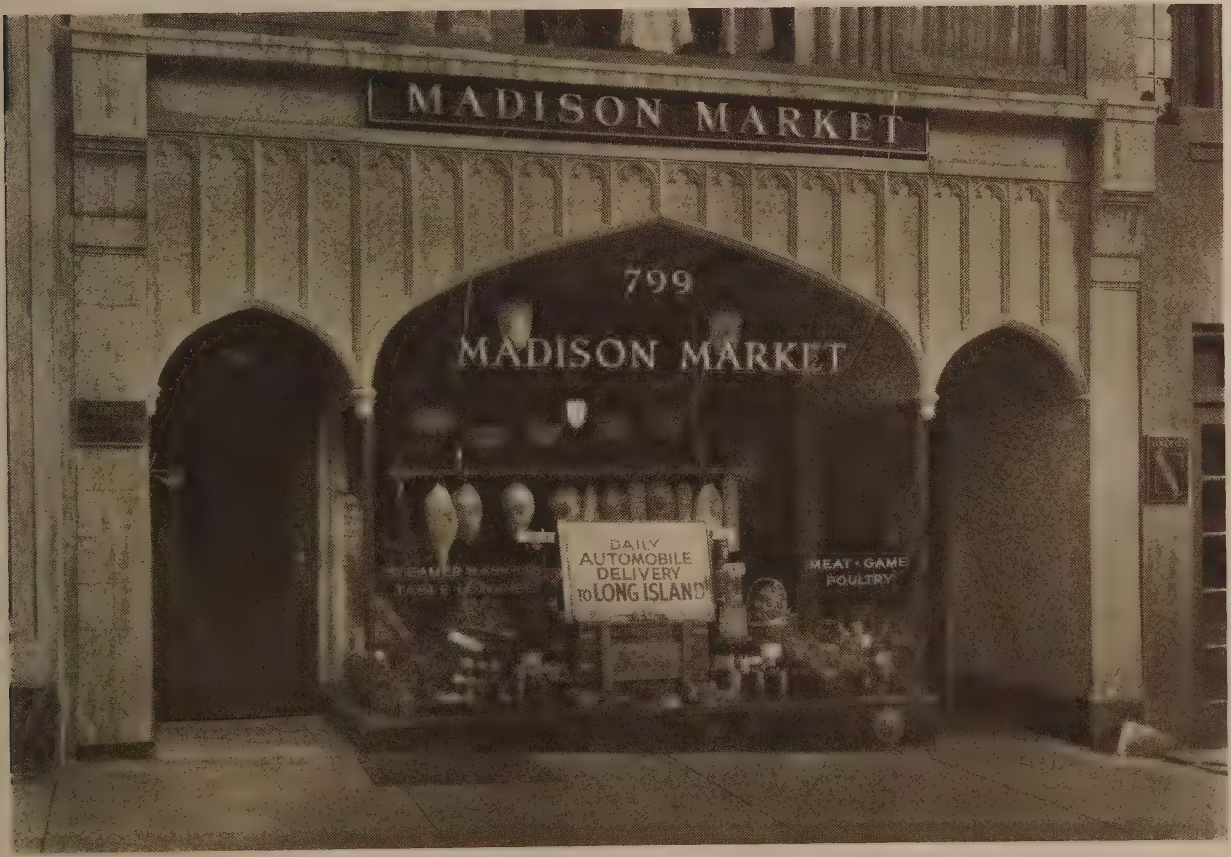


Store building, Chestnut Street, Louisville, Ky. Carl A. Zeigler, Architect.

REMODELLED BUILDINGS THAT ARE A PROFITABLE INVESTMENT, REPLACING THE OLD-STYLE SMALL CITY SHOPS AND TENDING TO IMPROVE COMMERCIAL STANDARDS OF COMMUNITIES OR NEIGHBORHOODS.

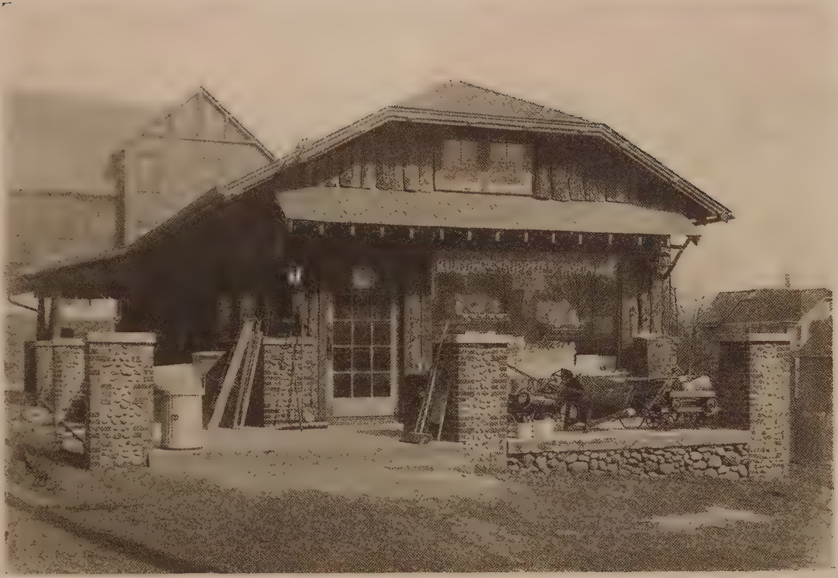


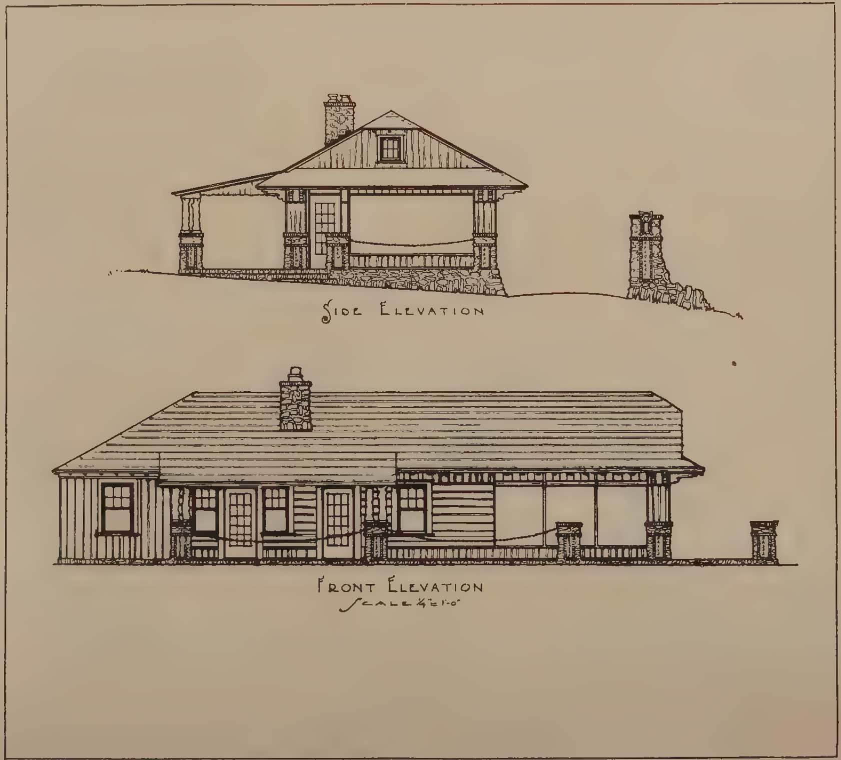
PLUMBRIDGE SHOP, MADISON AVENUE, NEW YORK.

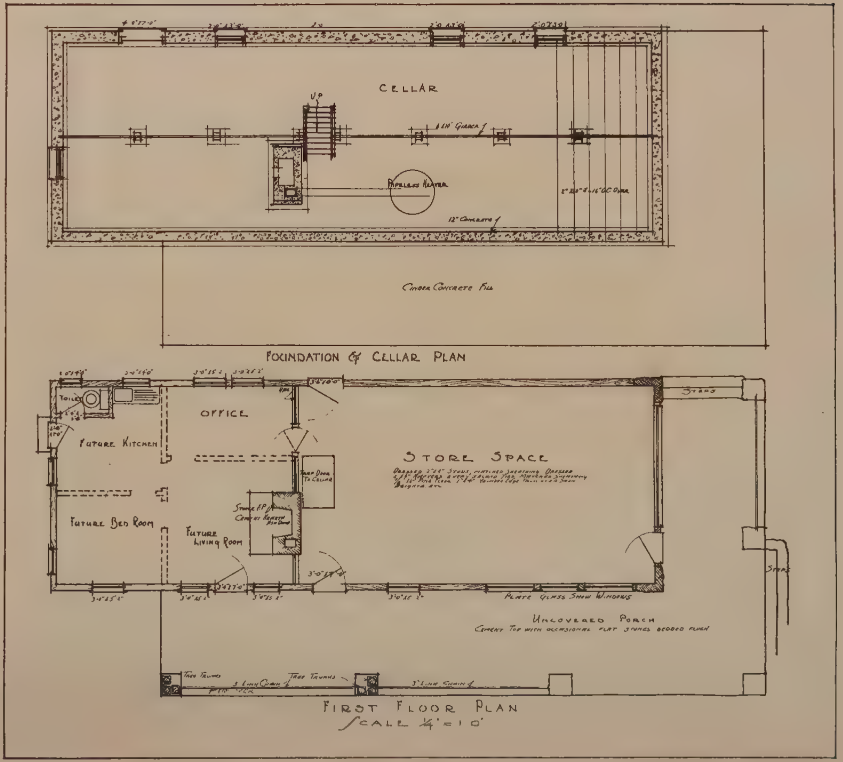


MADISON MARKET, MADISON AVENUE, NEW YORK. Hughes & Hughes, Architects.

TWO NEW YORK CITY SHOP FRONTS (ALTERATIONS).

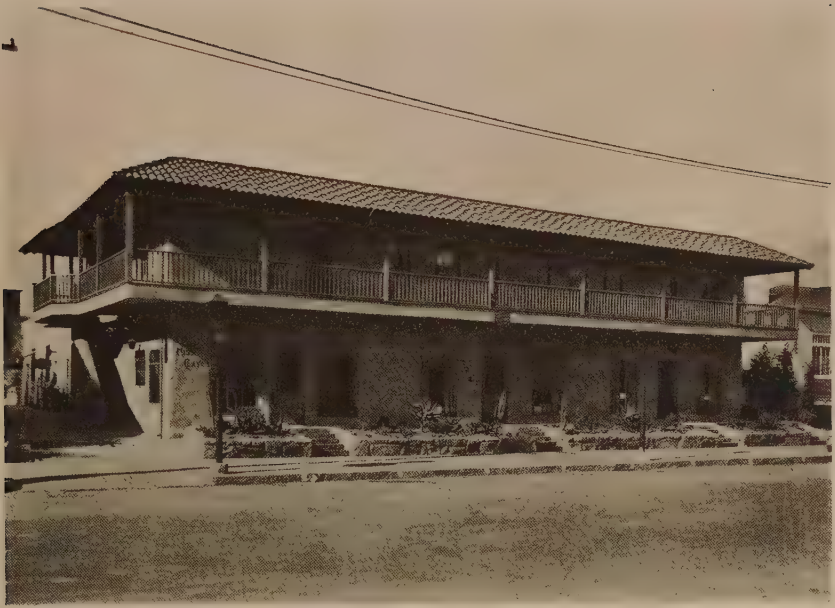






STORE BUILDING FOR CO-OPERATIVE BUILDERS AND PLUMBERS SUPPLY CO., RIVEREDGE, N. J.

J. L. Theo. Tillack, Architect.

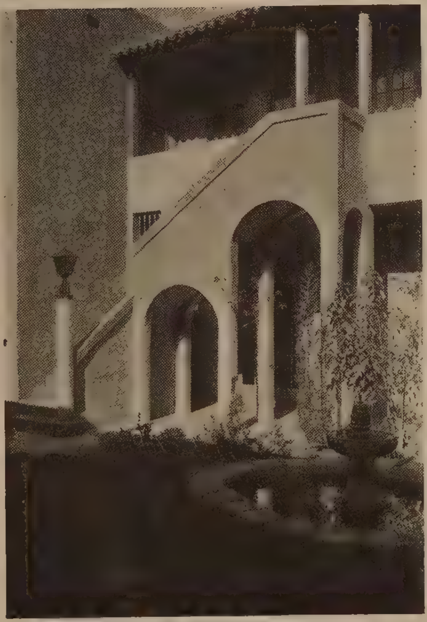


Mihran Studio Building, Santa Barbara, Calif.

Shop in Mihran Studio Building.

Shop in Mihran Studio Building.

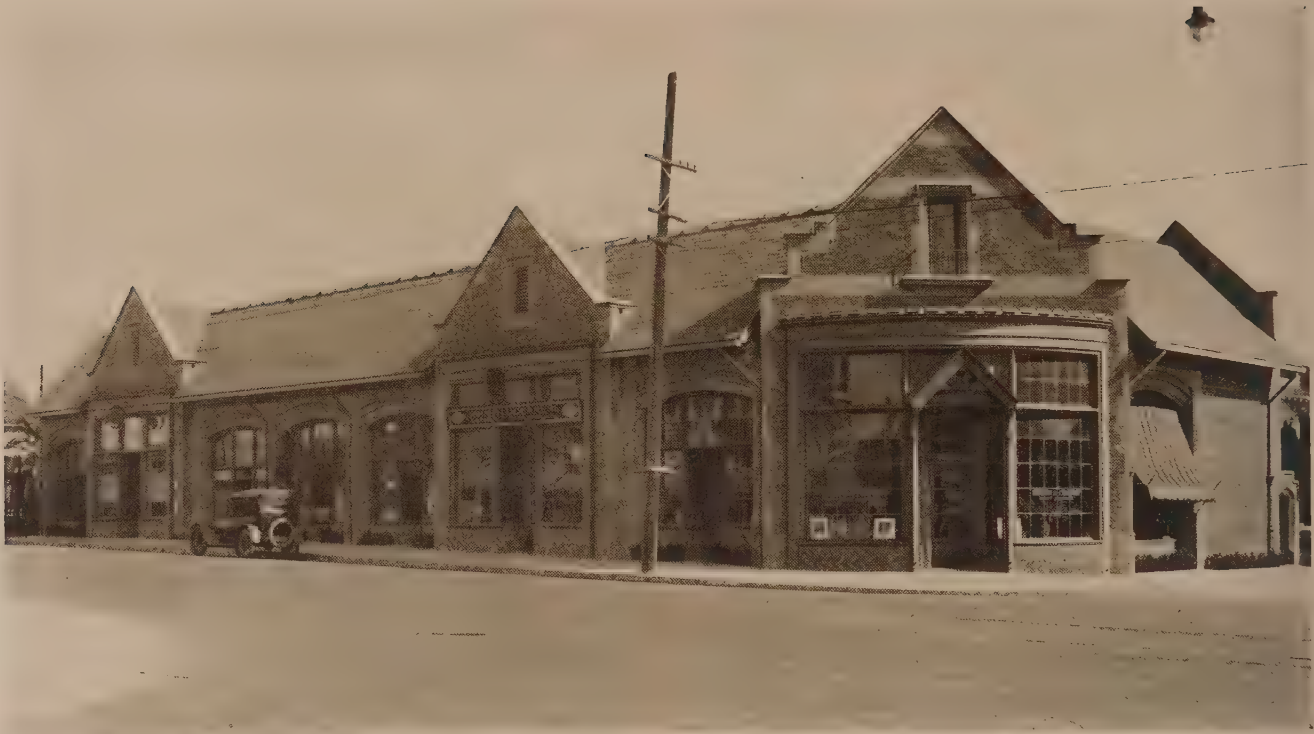
Decorator's Shop. Old Carrillo adobe.



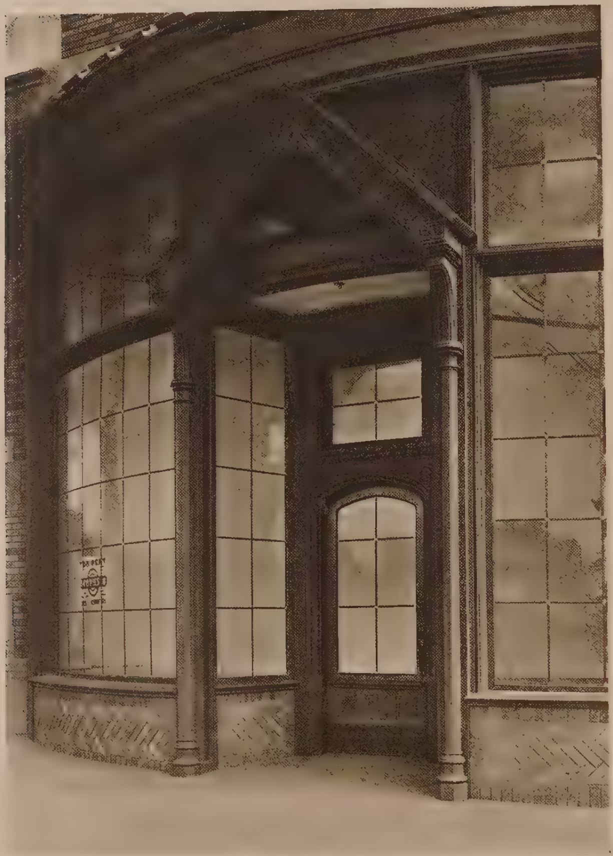
Courtyard, Mihran Studio Building.

Decorator's Shop. Old Carrillo adobe.

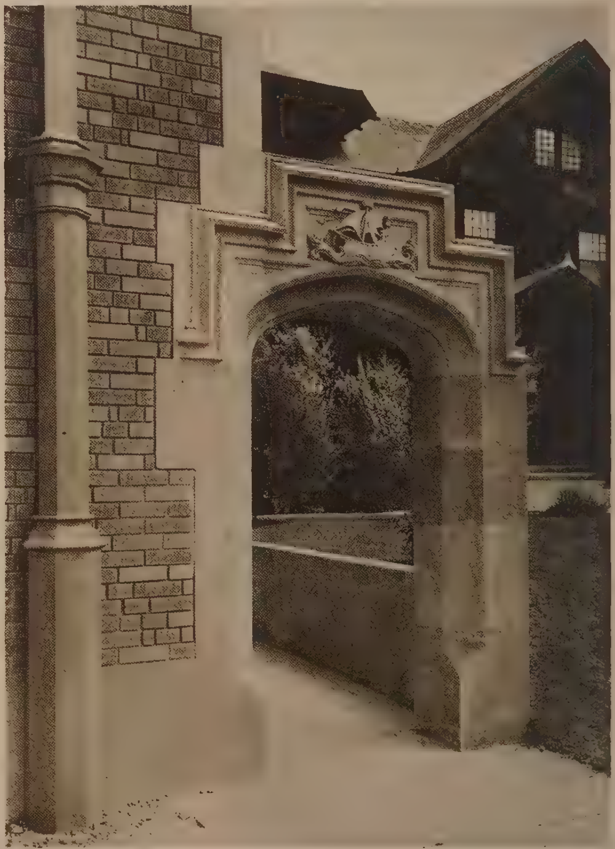
THE MIHRAN STUDIO BUILDING SHOWS HOW THE SPIRIT OF TRADITION IN THE OLD CARRILLO ADOBE HAS INFLUENCED THE NEW MIHRAN STUDIOS. Designed by Robert W. Hyde.



GROUP OF STORES.



DETAIL.



DETAIL. T. Beverley Keim, Jr., Architect.

GOODMAN STORE BUILDING, LOS ANGELES, CALIF.

# Manual of Office Practice

*By Frederick J. Adams, A. I. A.*

SECOND ARTICLE

## Administrative Section

### ESTIMATES

26. *Information.*—Where estimates are desired the information given the bidders should be *clear*, *concise*, and *complete*. Matters of detail *should not* be left to the estimator's imagination. Experience has shown it is practically impossible to hold a bidder responsible for omission from his estimate of work not clearly shown or described, even where apparently covered by a broad or general requirement of a specification.

The difficulty in holding a bidder responsible under broad or general requirements of a specification, or vague information given, is mainly the result of the high degree of specialization which has grown up in the building-construction business in late years, the greater volume and complexity of building, and keener competition in all lines of business.

A bidder who includes in his estimate what he may imagine from the language of a vague specification, or from an indefinite drawing, is certain to lose business to the competitor who includes only that which is definitely called for or shown, and who intends to demand extra compensation, when called upon to do the indefinitely described work. This is apt to result in a lawsuit and in any event a dissatisfied client.

A further possibility in this connection is that bidders will add a heavy contingent item to cover a doubtful part. This brings increased cost in its train and does not prevent a claim for extra compensation for the indefinite quantity, where the contractor is shrewd enough to see his opportunity, and he almost invariably is.

It is not safe to assume that a bidder is obligated, by any supposed business ethics, to call attention to any weakness in plans or specifications which would give him a whip hand over owner or architect in the event of a contract being consummated.

Make sure that opportunity is not afforded to the contractor to use such deficiencies in the architect's work as a lever (through covert implication of demands for extras with consequent embarrassment), to encourage a complacent attitude with regard to the quality of other work to be furnished, as an offset to the threatened extras.

27. *Basis.*—Estimates as a rule should be taken on a *minimum-cost* basis with alternates of increase for modifications suggested.

Bidders are under the necessity of figuring overhead and profit on the basis of the known quantity of work. In competitive bidding, where alternative bids are asked for added features or improvements, these items are frequently quoted without the added impost of overhead and profit, in order to make the primary bid more attractive when considered in connection with such items. This rarely entails any real sacrifice on the bidder's part, because improvements in quality of material are possible without increase of volume in work or overhead. Being covered on the cost of the improvement he only omits an inconsiderable item of profit.

On the other hand if the bids are asked upon the maximum basis, the bidder is apt to assume that to be the desired result, and having made his bid as attractive as possible, is loath to make allowances for decreases in anything but the net amount, leaving the original impost of overhead and profit intact.

There is another phase to maximum basis bidding resulting from failure to take into consideration the possibility of later changes which may materially reduce the quantity of work to be done under a contract. In the event of such changes, it is customary to allow the contractor's expected profit to him in arriving at the amount of the deduction. This custom is based on the usual judicial award where the matter has become a court issue. In such cases the amount of unearned profit which the owner has to pay is a net loss to him, as he receives nothing in exchange.

It is almost a certainty that a purchase on a *maximum* basis minus salvage for any quantity not finally used, will cost more than a purchase on a *minimum* basis plus any quantity needed to complete. The added quantity must, of course, be governed by an agreed upon basis of cost; otherwise there is nothing to prevent exorbitant charges.

In dealing with any proposition on a *minimum* basis, care must be taken that the client understands any quantity needed to complete is not an *extra* but is part of the originally estimated cost. Such an understanding is an absolute requisite for the satisfactory operation of the *minimum* basis theory.

28. *Request.*—The request for bid should state clearly and specifically what is wanted. Use form provided and state if bond will be required.

At no time should the architect's intentions be more definite and complete than at the time he asks for bids, and it behooves him to state clearly and intelligently what those intentions are. Nothing can be more disagreeable than to have long-winded arguments, months afterward, as to what was or was not intended at the time the bids were asked. This condition arises most frequently in cases of work ordered on the basis of snap estimates and with contract alternates.

Always bear in mind that, in a suit over a contract, the intentions of the parties, unless stated therein, receive scant consideration in determining the issue. When, therefore, the architect has stated his intentions clearly for the purposes of estimate, he is better able to provide for such intentions in the succeeding contract.

29. *Bid Form.*—Require bids to be submitted in duplicate on form provided.

The principal advantage of an *architect's bid form* is that any condition a bidder wishes to make, or upon which his bid is based, which differs from the stated requirements in the request for bids, is brought out more clearly and hence less likely to be overlooked. Many contractors use bid forms of their own devising, which contain (usually in fine print) multifarious conditions applying to the bid. Unless these conditions are read carefully in connection with the inserted matter in the bid, there is likely to be serious misunderstanding as to what is included.

*Where the contractor's wording is accepted without checking for accord with the requirements laid down, there is implied acceptance of his intent as to the extent of his intended compliance with the requirements.* (See Instruction No. 36.)

30. *Record.—A record copy must be kept* of any drawing or specification sent out for estimate and suitably identified for record. This applies to preliminary sketches as well as more advanced drawings.

31. *Competition.*—Competitive estimates are only to be opened by a member of the firm, then tabulated, checked for agreement with specifications and drawings, and suitable record made for the correspondence file.

32. *Transmission.*—Use transmission form in submitting estimates to client, unless otherwise directed by the firm.

All information covering amounts of estimates is confidential.

33. *Issue for Estimate (Drawings and Specifications).*—For competitive estimate—one set to each bidder without charge, to a total of not more than six in all. For competitive estimate for subcontract work under general contract already in force—the number of copies required up to but not exceeding six. All other sets to be charged at cost either against client or against bidder, as will be determined in the particular case.

The above applies particularly to work of some magnitude. Where the work is of small moment, with a limited number of bidders, an additional set can be given general-contract bidders if requested.

Any corrections or revisions made during the estimating period must be furnished to all bidders.

*All bidders should receive identical information.*

34. *Selection of Bidders.*—List of proposed bidders must be approved by a member of the firm before any request for bids is sent out.

35. *During Construction.*—Where estimates are taken during the construction period for changes which will affect work under way, or material ordered, it should be clearly understood whether such work or material is to be held up pending consideration of the estimates requested. Hold-ups of this sort give legitimate ground for a contractor to claim delay unless other agreement is reached in the individual case.

### CONTRACTS

36. *Acceptance of Estimates.*—In all cases estimates should be carefully checked for accord with specifications, drawings, the intent of the work, and time of completion, and the acceptance should be on the prepared contract forms, using the short contract form in duplicate for work of minor extent, and the regular contract in triplicate for all other work. Where any work is shown on plans and specifications, but not to be included in the contract, the contract should be so worded.

There are several factors to be taken into consideration, which make the checking referred to in this instruction important. First, to make sure that no change in the scheme or the conditions surrounding it had arisen during the estimating period which would not accord with the bids under consideration. Second, to make sure there had been no errors or omissions in the plans or specifications which would result in the contract being let on an incorrect basis. Third, to make sure that the bidder's understanding is in accord with that of the architect. A bidder cannot be held to his bid if the acceptance is made upon a basis differing from that estimated upon.

Even where the form in which the bid is to be rendered is laid down in the request (Instruction No. 28), contractors are prone to vary the wording of their bids, or add contingent phrasing affecting the understanding of what is included. Except where there is rigid enforcement of the form of bid as a condition of acceptance (usual only in municipal work and important private operations), informalities in the form, where the intent is checked as correct, are not treated as the sole cause of rejection. (See Instruction No. 29.)

### COST-PLUS CONTRACTS

The basic theory of the cost-plus contract is that the contractor is bound to purchase at the lowest legitimate basis, and to exercise every ability in so doing, that he would if the purchase were for his own account and profit. It is the province of the architect to see that theory and practice coincide.

It should be assured in accepting a bid on a cost-plus basis that the profit, commission, or fee to accrue to the contractor is the total remuneration to be accepted by him, and is not subject to concealed increment through discounting of bills, secret rebates, or other means, to the benefit of which the owner is entitled under the theory stated above.

### CONTRACT CONDITIONS

That relation of the architect to owner and contractor which requires him to balance their contractual interests equitably presumes him capable of giving proper weight to certain practical considerations which are involved in nearly all building contracts.

There is apt to be a very real difference in ultimate results between compliance with the *letter only* and compliance with *both letter and spirit* of a contract. The latter condition is the ideal to be sought. Realization will depend more upon the selection of a reputable contractor than upon the amount of the bid offered.

*Compliance with the spirit as well as the letter of a contract should not be only at the contractor's expense.*

Immediately a contract is signed, the owner and architect are placed at a disadvantage to this extent: they must accept whatever the contractor offers (whether in time, material, workmanship, or co-operation), *except at the cost of effective protest.*

The most vital provision of the usual building contract is that which gives the owner the right to complete work at the contractor's expense where the latter is in default. Practically speaking, the limit of this expense is any part of the contract price that has not yet been paid. Attempted recovery of cost or damage in excess of this balance is apt to involve long and costly court proceedings.

A condition which should be given due consideration, is that the owner is nearly always at a disadvantage in having more at stake in the outcome of the contract. Deprivation of use of premises or structure through the default of the contractor sometimes results in direct and contingent losses, the money value of which is far greater than the net money value of the defaulted work. Upon default of the owner the contractor is usually only jeopardized to the extent of the net money value of work or materials with a minimum of contingent loss.

### CONTRACT DISPUTES

The architect should not assume the responsibility of determining issues between general and sub contractors without very strong reasons, except only where an interpretation of the drawings or specifications is asked, and in certain cases arising in cost-plus contracts. In the first case, assuming all the subcontracts are identical in intent with the general contract, the usual provision, of the architect being sole judge between owner and contractor, carries through all underlying contracts.

It frequently happens, however, that a dispute between general and sub contractors, not readily susceptible of determination within the above limits, threatens delay or detriment to the owner. It then comes within the province of the architect, under his duty to guard equally the rights of owner and contractor, to intervene for the purpose of resolving the cause of dispute.

In the second case, arising under cost-plus general contracts, the architect and general contractor, for all practical purposes, become coagents of the owner, under which phase their co-operation in the resolving of disputes is a natural corollary. Beyond this co-operative stage a condition may arise in which the architect reverts to the status of judge between owner and contractor.

*In no case where the architect has occasion to intervene in disputes of the nature referred to should the general contractor be relieved in the slightest degree from his absolute responsibility for the proper and complete outcome of his contract.*

37. *Signed Set of Contract Drawings and Specifications.*—A complete set of general conditions, drawings, and specifications must be identified by the contract signatures, and dated, or in default of such signatures be identified by the architect for record. A similar set is to be given the contractor.

38. *Percentage Contracts.*—As a rule all proposed contracts between the general contractor and subcontractor are subject to the architect's approval before execution. When executed, copies should be filed in the architects' office, and also with the client.

39. *Insurance.*—The insurance obligation of contracts is of great importance but frequently overlooked. Both owner and contractor should be followed up until proper arrangement is made. Both should increase their insurance as their interests increase in value. Premiums for contractor's general liability coincident with his engaging in business are not allowable as cost, in cost-plus contracts.

40. *Prepayment.*—Where it is desirable to secure manufacture or delivery of material some time prior to actual need in the normal progress of the operation, an arrangement may be made with the contractor whereby such material can be partially paid for to save him undue hardship. Such payments should be limited in the owner's interest, as follows:

Only where the material is in such shape or condition of process of manufacture, or otherwise, that if conditions so required (such as inability of the original contractor to continue) others than the original manufacturer or contractor could proceed with the work to the intended finished result.

In a sum not to exceed 75 per cent of the then manufactured value (not including final profit) of the product upon receipt of a bill of sale and insurance policy; the remainder being payable in the regular way on delivery and erection, in proportion to complete installation. In important cases also secure a lease for the storage space.

Where such an arrangement is made which is of benefit to the contractor or manufacturer through assisting his manufacturing schedule or system, no charge for storage at shop awaiting shipping instructions is allowable. The latter should be limited solely to cases where the condition of the building creates an obligation.

41. *Extras and Credits.*—Must be carefully checked and orders issued are to describe the work to be done clearly and concisely. In all cases it should be thoroughly understood and so stated in the order, if the change made affects the owner's rights under the original contract.

Where required, note date of owner's authorization on face of order.

Copies of or full information concerning all extra or credit orders must be furnished to the field superintendent.

There will be a gain of clarity of understanding between owner and architect, which will relieve the latter of much undeserved criticism, if the essential difference between *extras* and *additions* is kept in mind. The first is due to the incidence of a condition, supposed in general good faith to be included as a liability of the contractor, but which it is found cannot be required of him under the contract, without extra compensation. The second is due to a *redetermination* of what is to be done or how, after the contract is in effect.

There should not be any assumption on the part of architect or owner that the contractor can or should be prevailed upon *by the architect* to provide, without fair additional cost, any small or large items not included at the time the contract was made.

The contractor should not be allowed to assume that savings effected by permitted reductions in the quality of work or material specified are to be for his own sole benefit, without the owner receiving an equivalent.

42. *Extras.*—In considering extra claims based on allegations of delay or unforeseen conditions met or to be met, the question of the normal building hazard of a trade must be allowed for. As an element of practically all claims for extra, except where a predetermined cost has been agreed upon, there is usually allegation of delays originating in this, that, or the other act, or failure to act, of some one else, or conditions arising at the building not reasonably foreseen (as, for instance, structural steel out of line or level, causing additional cutting or fitting of stone or terra cotta, slight differences in floor levels affecting stairs, extra fill in floors, etc.). To support such a claim, the contractor must establish, first, no default on his own part, and second, that the condition on which the claim is based is beyond the normal experience or hazard of his trade.

(*a*) As building is not an exact science, each of the underlying trades includes an element of imperfect conditions under which it must operate, and it must be assumed that the contractor protects himself by suitable contingent costs, when estimating, based upon an averaging of his business experience. Where responsibility for an abnormal condition can be directly traced, any recovery from the one at fault may be properly turned over to meet an extra claim when properly established. Similar situations frequently arise in controversies in the field prior to demand for extras, or in adjusting the work of various contractors.

(*b*) No charge for increased cost to contractor resulting from action of governmental or other authority outside the control of the client during the life of the contract is allowable, unless specifically provided for in the contract.

In all considerations of extras and allowances, an equitable arrangement must be sought as a basis of settlement, which at the same time is in harmony with the terms of the contract. This last is essential, as settlement outside the intent of the contract may seriously prejudice the owner's continuing rights, such as guarantees, or establish objectionable precedents.

In considering claims for extras, it must not be forgotten that the contractor brings to bear in his prosecution a highly developed knowledge of the minutiæ of his business, which the architect cannot hope to equal. The contractor is in a position to enlarge to great extent on a series of minor matters and allegations, and so manage to build up an apparently overwhelming volume of evidence favoring his claim. Upon careful analysis it will frequently be found the bulk of argument is based on weak or false premises, or is not required to be considered under a clear interpretation of the contract. Regardless of whether the contractor's arguments are good or ill, the matter generally resolves itself to a situation where the architect, in his capacity of judge between owner and contractor, must or should render an equitable decision. This may result in the architect agreeing that his plans or specifications did not cover the disputed item, and the issue of an order to cover, or a decision against the contractor on clearly stated grounds. The clearer and more just the decision of the architect, the less likelihood of litigation, and in the event of litigation the more likelihood of his judgment being sustained.

43. *Overtime.*—Charges made by contractors for the bonus time paid mechanics for overtime should not include profit and complete overhead, but should be limited to the actual cost involved in connection therewith. No office-supervision charge can be included, as the bonus time is merely an increase of time cost. Examine subcontract forms in this connection.

The dictum laid down in this instruction is applicable to cases where overtime is only of incidental occurrence.

Where overtime for extended periods is necessary, it has become customary to arrange special terms in order that the contractor may be reimbursed for the consequent drop in the efficiency of his labor. Both contingencies should be covered.

Overtime necessarily involves additional cost without equivalent benefit, and therefore should be kept down to a minimum.

Overtime necessary to make good any default or delay of the contractor is at his own cost, and does not fall within the action of the foregoing.

44. *Omissions.*—Where contract contains provisions of unit prices for additions or deductions and the unit for deductions is less than for additions, such reduced units should not operate unless the gross amount of the contract, as completed, is less than the original contract amount.

Where the omission affects specially designed and manufactured materials, the deduction should be the difference between the manufactured value at the time the change is made, including a reasonable item of profit, and the total value of the unit omitted.

This protects the contractor against loss by undue cancellations, and at the same time protects the owner in that he pays only for work actually done in his interest.

If this provision is not made, the owner is liable for the entire value of a unit the moment manufacture is started. Otherwise the contractor would be penalized by omissions through showing diligence in going ahead with his work, prior to an actual demand for it at the site. On extensive operations an understanding should be had at the time the bids are taken, as, with part of the risk eliminated, the bidder can figure on a closer basis. (See Instruction No. 46.)

45. *Change Record.*—An accurate single-sheet record should be kept of all changes, numbered consecutively and given short titles wherever practicable. The record should indicate date of origin of the change, approval by client, sending for estimate, date of final approval, authorization, or other determination. The system of numbering must originate with the architect's office, and all underlying orders issued by the general contractor should contain the architect's change number by which it is covered.

In percentage contracts copies of all change orders issued by the general contractor to subcontractors should be filed and an appropriate record kept for quick reference.

Where a change is discussed between the parties to the general contract, it is usually upon a lump-sum basis, and under a designation indicative of its most important feature. When ordered ahead the general contractor issues underlying orders to the various subs for their respective parts of the work. Because of variation in trade, amount, location, and so forth, involved in the wording, it becomes difficult to identify the underlying orders with the original change unless an identifying number is carried through them all, and through instructions incident thereto.

The general contractor's system of numbering need not be changed, if provision is made for supplementing it with the change-order numbers laid down by the architect.

46. *Change Reports.*—No changes are to be made after work has started until the architect's superintendent has reported as to what part or parts of the work already in hand will be affected thereby, and as to the effect on the cost of the work.

Very often there is temptation to proceed with a change, apparently simple in scope and roughly estimated as being relatively inexpensive, without adequate investigation of all the factors involved. Going ahead on such a basis is apt to bring about one of two results, either of which reflects on the architect. The client has to meet a heavy expense where he had been permitted to expect a moderate one, or is forced (when the actual facts are ascertained) to abandon a course embarked upon in the light of insufficient knowledge. In any event there is disappointment and invariably the architect is held solely responsible.

Whenever any change is made in the kind or quantity of material on order or under contract, there is practically always a loss on any discarded portion, as usually it can only be disposed of at scrap value. This is true whether any deliveries have been made or not.

The supplier of goods affected by changes cannot be expected to absorb a loss because client or architect wants to use something else. (See Instruction No. 44.)

47. *Working Estimates* (*in Case of Straight Contracts*).—For the purpose of properly checking monthly applications, the contractor at the beginning of the work should file a working estimate itemizing the value of the work of the various trades, each of the items to include its proportionate part of general contractor's overhead, profit, etc. Payment is allowable only for the part of any item completed in place, and the contract reserve is retained against the whole amount approved. Unless otherwise covered by contract, no payment is allowable for materials delivered but not erected.

Working estimates should be checked for proper balance. At times the items of work to be done first will be found to be padded far above real value, and later sections listed below real value. Unless corrected, the result will be the overpayment of the contractor as the earlier portions of the work are done, and the material reduction of the owner's security for the balance. Aside from the risk involved, the contractor is enabled to finance the work at the owner's expense, thereby increasing his profit unfairly.

(*a*) In case of large contracts, where the retained percentage would attain large value as the work approaches completion, it is proper, if the work is proceeding satisfactorily, to take up with the client any request of the contractor for a reduction of such reserve.

*For Percentage Contracts.*—

(*b*) A similar working estimate is to be made up of the stated amounts of subcontracts as let, and that part of the work being done by the general contractor itemized into its various divisions, as items of the application. In such contracts the amount of work is to be checked against the net amount of the working estimate, and the profit figured on the total approved.

The original estimate (approximate or otherwise) should be itemized in a manner to constitute a budget. By this means the running cost of the work, or parts thereof, can be checked against fixed sums, in order to show excesses or savings against the estimated basis. This checking should be done when underlying contracts are being let, and also whenever applications for payment are received for work being done on a cost-plus basis.

The proportion which the sum of the last-mentioned payments bears to the budgeted amount and to the percentage of completed work, is one of the few ways in which foreknowledge of prospective excess cost can be obtained.

(*c*) Suitable dates for submitting applications should be agreed upon with the contractor so as reasonably to enable him to get discounts for cash payments, etc. This should be insisted upon in percentage contract work where such discounts operate to reduce the cost of the work to the owner, and should be so administered.

(*d*) *Accounts.*—Contractors' applications for payment are to be submitted in duplicate and must be itemized for the various trades, and wherever practicable should be on the standard office form provided. Immediately upon receipt from the contractor, the application should be checked by the field superintendent, the amount in it approved noted, and then the application given to the bookkeeper. The duplicate copy of the application, showing any modifications made in the items and total, should be sent the contractor with the certificate. Sometimes it is necessary to provide the owner with a copy of the approved application.

(*e*) The application should indicate where payment is asked for extra work. Applications for small or single-payment accounts can be in ordinary bill form, but must be in duplicate, so that after certifying a copy may be filed for record.

(*f*) *Certifying Payments*—by issue of regular certificate. This is to be used in case of all contracts requiring a series of payments, and must be signed by a member of the firm.

(*g*) By indorsing a copy of the bill "Approved for payment in the sum of $......, Date........" This is to be used in all cases where relatively small amounts are involved, single-payment accounts, etc. The indorsement is only to be done by the bookkeeper.

(*h*) When a certificate, or certified bill, is issued it is to be sent directly to the contractor, and a copy of the letter of transmission sent to the client.

(*i*) Use only one form of certificate for each operation.

(*j*) Special forms of certificates are required for certain particular kinds of payments, as in case of stages of payment on building-loan agreements. Consult the bookkeeper as to form to be used.

(*k*) *Guarantees.*—Before final payment is allowed on any contract or subcontract, individual guarantees running through the contractor to the owner should be secured and filed.

This provision is to meet the possibility of the general contractor being unable to make good upon call, under the guarantee clause of the contract. It enables the owner to hold the particular subcontractor affected to the terms of the guarantee, without the intervention of a third party.

A guarantee must first be enforced against the general contractor, and only upon his default against the subcontractor direct.

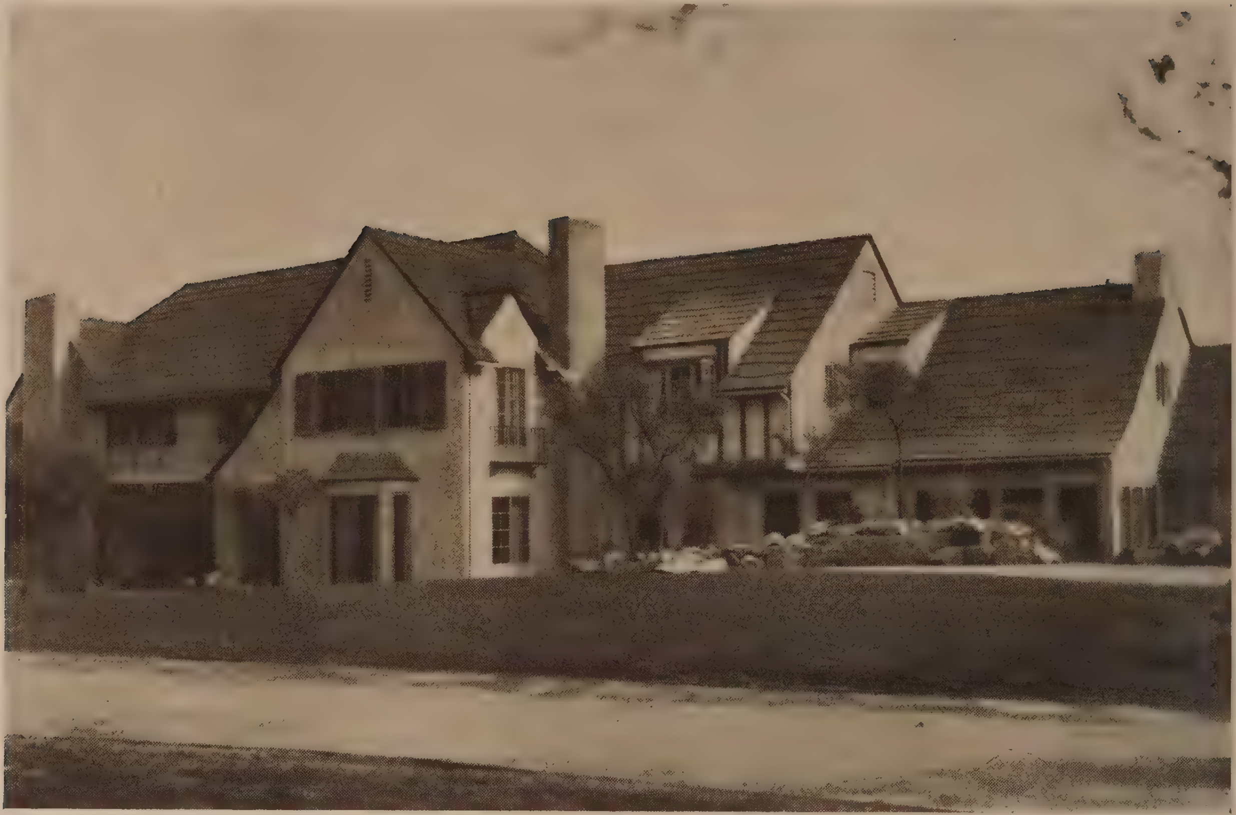
If any work is done upon faulty guaranteed work, without the general and sub contractors having first defaulted on notice to make good, said contractor can no longer be held responsible, except only where such work is of an emergency nature to prevent further damage or remove a danger.

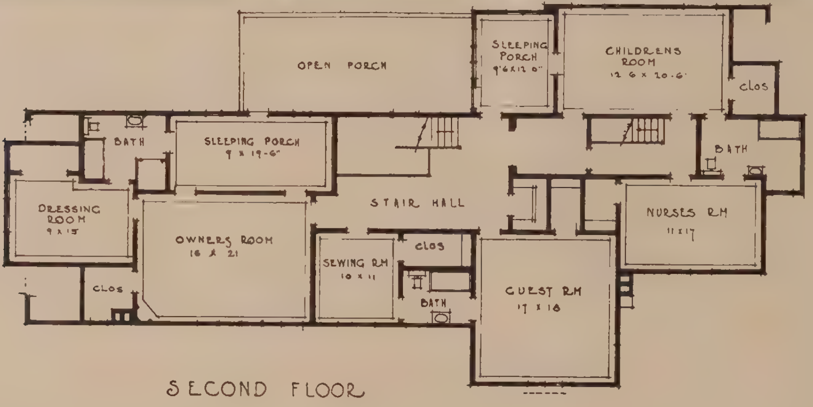
## How San Francisco is Solving the Wage Problem

SHORTLY after its creation in 1921 the Industrial Association of San Francisco, as a part of its pledge to the public, promised to fix, through impartial machinery, and enforce an equitable wage scale in the building trades for a reasonably definite period. Accordingly, in November of last year the association appointed an Impartial Wage Board, consisting of the Catholic archbishop of San Francisco, an attorney and former supervisor, and a prominent wholesale druggist who had been president of the San Francisco Chamber of Commerce—three men whose impartiality and ability were universally recognized.

This board, after conducting an extended series of public hearings at which appeared and testified representatives of labor, the employers, and the general public, fixed a wage scale for the calendar year, 1922. This scale proved so fair that it never was seriously complained of, and no doubt was responsible in large measure for the splendid record of building activity made in San Francisco this year. The value of building permits for the first eight months of this year exceeded by over $10,000,000 the value of the permits for all of last year, and it is expected that the value of permits for the year will show a 100 per cent increase over 1921.

In view of the unquestioned successfulness of this method of wage fixing, and in order to prove beyond doubt to the workers and the community the good faith of the Industrial Association, the association has persuaded the same men who composed the Impartial Wage Board last year to serve again this year, in order to determine upon an equitable scale of wages to obtain in the building trades after December 31. Sessions of the board are now in progress and will continue until all parties in interest have had opportunity to be heard. Building-trades workers have generally been invited to attend or send representatives. Craft union organizations and contractors' associations have also been given written notice of the hearings and asked to submit evidence, and the Wage Board has announced that it will be glad to hear from individuals not connected with the building industry, in order to get the view-point of the public.





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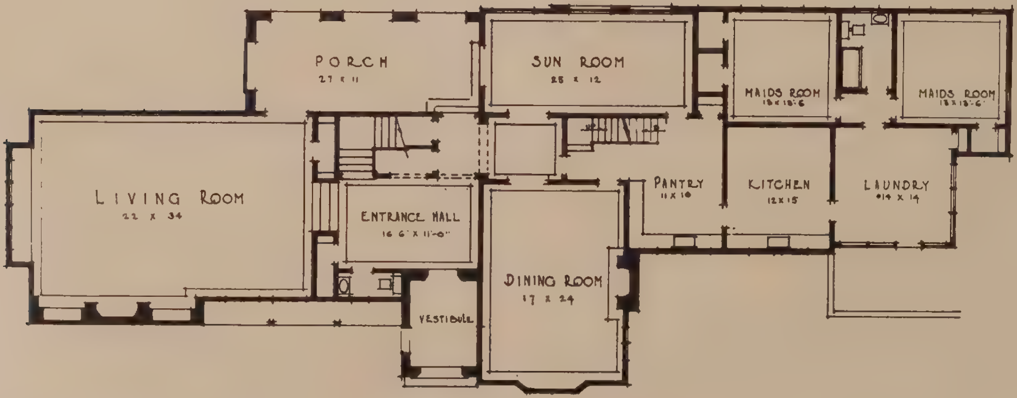
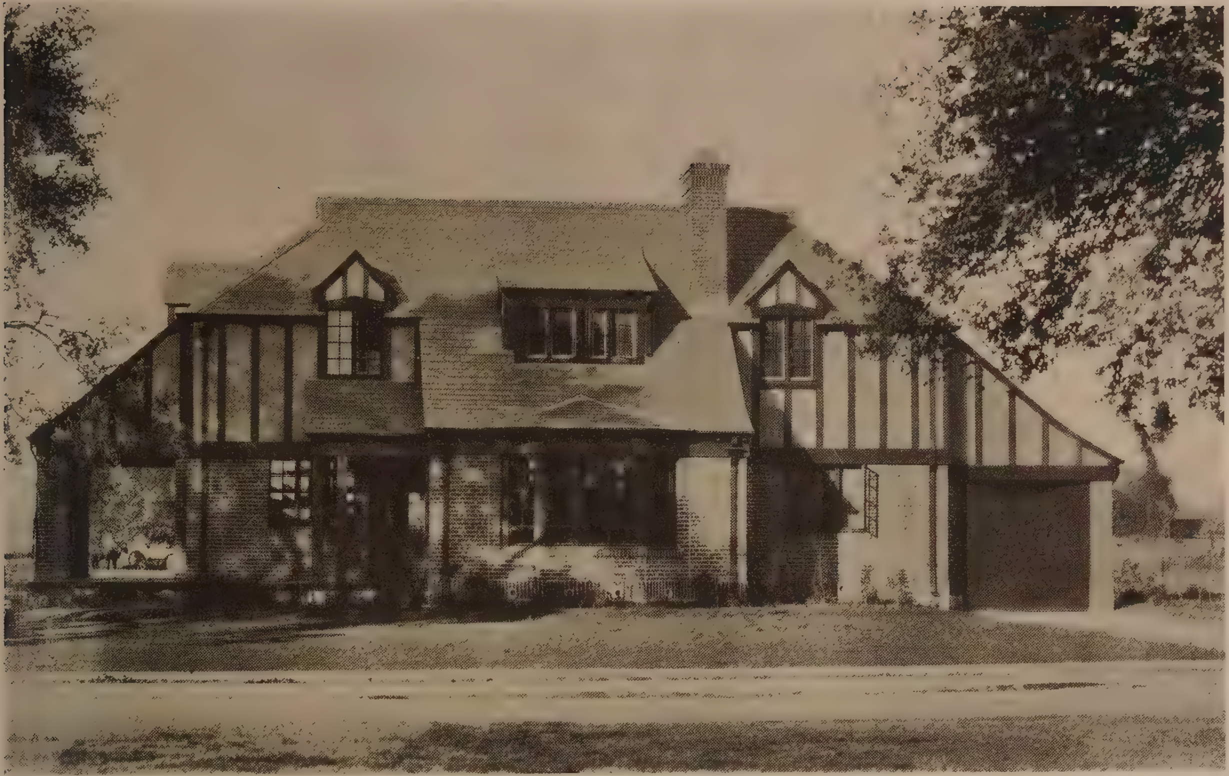
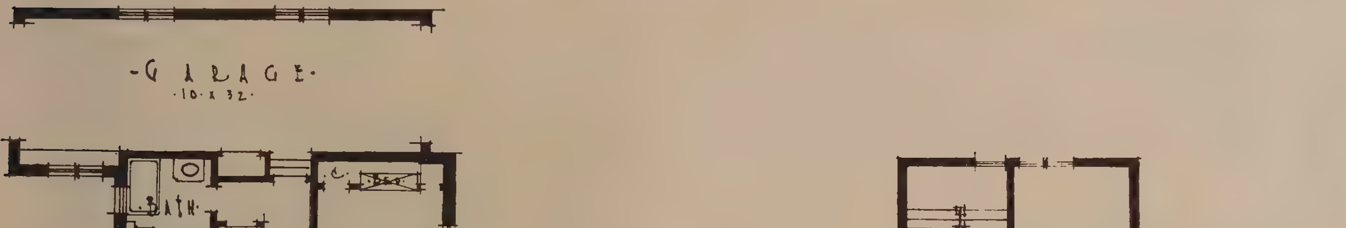


~ FIRST FLOOR PLAN ~

HOUSE, LOUIS CASS, FLINTRIDGE, CALIF. Paul R. Williams, Architect.

Outside walls are of stucco over frame and left natural color. Half-timbering strips are adze-hewn, and, together with remaining exterior woodwork, aged with acids to a nut-brown shade. Roof of split shakes, laid in double thickness and in waved courses. Terraces paved with flag sandstone. The house has a large basement and is equipped with furnace heat.





HOUSE, W. F. MARMION, SAN GABRIEL, CALIF. J. A. Larralde, Architect.

Outside walls of first story consist of brick; of second floor of cream-tinted stucco over frame. Wood trim is in chocolate brown. The roof is of slate, and the porch is floored with dark-brown tile. The plan includes attached garage.

# Perplexities of Estimating

*By DeWitt Clinton Pond, M.A.*

FOURTH ARTICLE

THE one point that has been emphasized in the articles of this series is that the architect can have only an approximate idea as to the cost of a building when he reaches the stage where the preliminary sketches have been completed. There are, of course, any number of cases where architects have made very close guesses as to the final cost of a structure, and such cases may average a little higher than 50 per cent of all the preliminary estimates that are made, but, under the conditions that have prevailed since the war, it is doubtful if the average is much higher than this. In spite of this, however, the practice has sprung up among certain kinds of architects of competing upon the basis of the cheapness per cubic foot of the buildings that they design.

Of course there are certain types of designers who have no idea of saving money in the construction of a building. These men, with the best intentions of giving the client the most direct plan, locate certain of the rooms in their buildings in a manner to make long spans of girders necessary, or for the purpose of obtaining deep reveals will call, in plan, for solid thick walls where light combination walls would have done just as well. However, where practices of this type are sometimes indulged in, it is usually the case that architects are more than careful to design their buildings so that the construction is most economical. They have found that clients are interested in costs to such an extent that, in order to obtain the artistic effects that the designer thinks necessary, it is necessary to economize where possible to do so.

Therefore, two architects, given the same problem, would design buildings that would rate about the same on the basis of cost per cubic foot, and if the costs were not alike, it might be that the higher one was more than justified by the artistic results obtained or the efficiency of the plan. The variation in cubic-foot cost would not be enough to justify the first architect in saying that he would be able to design a much larger building than the second architect had designed, but for exactly the same cost. This, however, is about the type of argument used by certain architects before building committees when trying to obtain commissions.

An architect would come before such a committee with a well-developed set of sketches. He would have in mind the cost of the building which had been stated in the programme, or had been agreed upon in conference, and would have designed the plans and elevations in such a manner that as far as he was in a position to judge, the building could be erected within the appropriation. A second architect, realizing that few of us have a very clear idea of the relationship between the bulk of a building and its cost, would enter into the competition with a set of plans that would call for a much larger building, but as he would claim that such a structure could be built at a cost per cubic foot that was much lower than stated by the first architect, this larger design would cost no more when the work of construction was undertaken.

The absurdity of this type of competition is apparent to one who is familiar with the conditions underlying the methods of determining costs of buildings, but the arguments that unscrupulous competitors advanced of this nature often resulted in convincing owners and in causing them to give the work to the less conscientious man. It would take a very wise, informed, and level-headed committee to refuse to accept the designer of the larger building in preference to the one who advocated the smaller plan.

In the larger building there would be required ten bricks for every nine in the smaller one; ten cubic yards of stone in place of nine; ten barrels of cement where nine would be required; ten hours of labor for every nine. By some strange alchemy the architect who developed the larger plan can make the ten cost no more than the nine. This would require some expert shopping, even if the architect had a more direct control of the cost than he has, but when it is considered that it is the contractor whose bid will determine the cost of the building, and who is the one who must do such shopping, the type of competition appears in all its foolishness.

The results of this type of work are apparent where owners are led into having buildings designed that are much more expensive than they can afford to build. Sometimes the buildings are erected by means of the most drastic types of financing, but the results are not to be recommended. The owners find out too late that the architect was no alchemist, and that a large building will cost more than a small one, except where unusual conditions are to be contended with.

An interesting case of this type of competition came to the author's attention in which a competition was held for the design of a school building in a small town near New York City. Needless to say the competition was not held under the rules of the American Institute, and because of this there were none of the considerations extended to the architects that one comes to expect. About the only thing that the School Board had in mind, that could be definitely stated as one of the conditions, was that the school should cost not more than $400,000. All sorts of plans were submitted, and the sizes of the buildings varied in the most grotesque manner, but in spite of the variation in size, all the plans submitted could be used for the basis of constructing a building that would not cost more than $400,000, according to the various architects who submitted them. Even the School Board saw that this condition was absurd.

Because the architects who competed for chances to design various kinds of welfare buildings resorted to the type of competition that has been outlined above, the International Committee of the Young Men's Christian Association organized a bureau which is now known as the Building Bureau, for the purpose of advising such associations as are in need of the services of experts, with regard to the planning of their buildings. There were other reasons for the formation of this bureau, of course, but the fact that certain associations were laboring under the handicap of attempting to furnish a certain type of service in a building that was not adapted to this service, and therefore expensive to maintain, and also in buildings which cost more than the association was in a position to pay, made the formation of such a bureau imperative.

There are peculiarities of the plans of buildings of this kind of which an architect, who has had little experience in this sort of work, has little real knowledge. It is generally known that there are both men's and boys' departments in the various buildings designed for the Young Men's Christian Associations scattered throughout this country and in various cities in Europe and South America and in parts of Asia. It is also generally known that there are gymnasiums, swimming-pools, shower-rooms, bowling-alleys, classrooms, dormitory-rooms, and squash-courts, as well as many other spaces devoted to social activities. However, it is not generally recognized that there must be centralized supervision over all the different kinds of activities that are conducted in such a building. There is an almost endless number of details which must be taken under consideration when such a structure is planned, and an architect who is not familiar with them is apt to plan an inefficient building, and even a costly one. Who is to decide whether there is to be an auditorium in the building or not? If there are to be bowling-alleys, how many should there be, and where should they be located in the building so that there might be proper supervision? Should there be two gymnasiums? There are any number of questions to be decided, and often the general secretary who is in charge of a particular association is not always the most competent person to decide upon the requirements that should form the basis of the building programme.

Therefore, there is a very useful part for an advisory body to play when it comes to the matter of deciding as to the size and functions of an association building in a certain city. The Building Bureau of the International Committee plays such a part. One of the most useful things it does is to bring home to the various building committees and secretaries that there is a direct relation between the bulk of a building and its cost. The bureau has done away, almost entirely, with the practice of competing architects of attempting to secure commissions on the basis of the cheapness of the buildings that they design. The bureau has demonstrated that a building of a certain size, and designed with a certain regard for the ordinary economies of construction, will cost about the same, whether it is designed by one or another of the competing designers.

There has also been developed a certain type of service which is known to the better class of school designers, in which the requirements of a building are listed, the approximate cubic contents of the building determined from such requirements, and the cost of the building arrived at approximately before a line is drawn. This is a very important kind of service, for it enables a building committee to decide before any sketches are started whether it is too extravagant or not in its requirements.

It can be seen that the cubic-foot cost is an important item in the determination as to whether it is possible to proceed with a large or small building programme. The bureau has made a very careful study of this matter, and, if the general conditions surrounding cubic-foot prices are kept in mind, the figures which have been secured by the bureau are very interesting, and can be used to advantage.

Before giving a few of the figures, however, it might be of advantage to point out that there are some unaccountable cases where the costs have jumped far above the general price level of the district in which the building is located. There does not seem to be a very good explanation of this, as it is often the case that the building which shows the highest cubic-foot cost has been most carefully planned, and the materials specified to be used are the least expensive. It can be seen that an estimate arrived at by simply obtaining the cubic contents of one of these welfare buildings and by multiplying such contents by a unit price can only be a guess at best, even if the cubic cost is taken after a careful investigation of the costs of similar buildings in nearby cities.

A case in point is the Association Building at Easton, Pa. This building contains 691,688 cubic feet, and the contract was let for $435,763, or at a cost of 62½ cents per cubic foot. This is an unusually high price. When it is considered that the large Central Association Building at Pittsburgh cost but 50 cents per cubic foot, it can be seen that the unit cost of the Easton building is one of the few that do not seem to follow any rule, and that it must have been influenced by some yet to be discovered local condition.

A building in Detroit also was contracted for at a cost of 66 cents per cubic foot, the highest unit price—outside of New York City—that the bureau has as yet had to deal with. Detroit is generally regarded as a city in which building costs are not high, but the cost of the new Association Building would not seem to bear out this view. No one has given a satisfactory explanation of these particular prices.

While these two conditions represent the two highest unit prices, the other unit costs do not exceed 55 cents, and in a general way the prices range from 36 to 55 cents. The lower-priced buildings, however, are usually non-fire-proof. In the Eastern and Northern States the price per cubic foot for a fire-proof building of this type averages about 45 cents in the smaller cities and towns, and averages about 50 cents in the larger cities. In the Western and Southern States the prices are somewhat lower. A non-fire-proof building in Augusta, Ga., was contracted for at the low unit price of 28 cents, and a similar building in Santa Ana, Calif., was contracted for at 35 cents per cubic foot. Even in the Eastern States, however, non-fire-proof buildings were built at a unit cost of 36 cents.

In a general way it might be said that for a non-fire-proof building in the East it would be fairly safe to figure on a basis of from 38 to 42 cents, depending upon local conditions, of which it might be stated the members of local building committees are not always the best judges. For a fire-proof building of the type referred to it might be safe to figure on a basis of from 45 cents to 50 cents. In about seventy-five cases out of a hundred guesses based upon these figures would be near enough to being right to show a fairly reasonable knowledge of building costs. In the West the prices might be taken as a little lower than these, but not much lower than 35 cents for non-fire-proof buildings, nor than 40 cents for fire-proof buildings. This also holds true for the States in the South.

In spite of the fact that the Building Bureau has done its utmost to collect reliable information as to the cubic-cost figures, it can be seen that there is nothing that can be stated as definite in the findings. The buildings are all very similar, even when there is the difference between fire-proof and non-fire-proof buildings. The ranges of prices vary, however, from 28 cents to 66 cents, and one must use no small amount of common sense when trying to determine from preliminary plans what the final cost of a building will be.

With regard to the general type of buildings, it might be said that association buildings are apt to cost much more per cubic foot than others because there is much that is crowded into the available spaces, and the plans are, therefore, busy—to use an architect's expression. The floors that are divided into sleeping-rooms are particularly so. Then, too, the tile-lined swimming-pool, the tiled shower-rooms, the bowling-alleys, and cafeterias are all expensive units in themselves. Therefore, the prices which have been given above for buildings for the various associations that are to be found in the different cities and towns could not be taken as applying to school buildings, for example.

A word might be said for the unit prices for buildings which are similar to association structures in New York City. Two of this type were recently sent out for bids. When the bids came in the prices were 75 cents and 80 cents per cubic foot. It would seem as if the peak had been reached in New York.

## Summer Courses in Architecture at Carnegie Institute

OF special interest to our readers are the courses in architecture that will be given this year at the Summer Session of the Carnegie Institute of Technology, in Pittsburgh. According to an announcement, the Department of Architecture in the College of Fine Arts will give intensive six weeks' courses from June 16 to July 26 in Design, Outdoor Sketching, Descriptive Geometry, Shades and Shadows, and Perspective.

Six and eight weeks' courses are announced also in Chemistry, Physics, Mathematics, Mechanics, English, Economics, Commercial Law, Drafting, Surveying, and various shops. Courses of six weeks will be given to teachers and supervisors of Home Economics, Public School Music, Fine and Applied Arts, and Manual and Industrial Arts.

## Differences Between Heart-Wood and Sap-Wood

SAP-WOOD is the outer light-colored portion of a tree-trunk, through which the water passes from the roots to the leaves, and in which excess food is stored temporarily. Heart-wood is the central core of the trunk. In most woods the heart-wood can be distinguished from the sap-wood by its darker color. But in hemlock, aspen, cottonwood, some beeches, all spruces except Sitka spruce, basswood, holly, hackberry, tupelo gum, and the true firs (not Douglas fir), there is very little difference in the color of the heart-wood and the sap-wood.

As new sap is formed on the outside of the tree-trunk, the inner sap-wood changes to heart-wood. During this change the living cells die; the pores of some woods become plugged up with a frothlike growth, known as "tyloses," and the cell walls, and in some species the cell cavities, become infiltrated with various substances, some of which darken the wood. These infiltrations do not add appreciably to the weight of the wood, except in species like ebony and rosewood, in which the pores become filled with deposits.

In over 500,000 tests which have been made by the Forest Products Laboratory, Madison, Wis., on the various species of woods grown in the United States, no effect upon the mechanical properties of the wood due to its change from sap-wood into heart-wood has ever been noticed. The heart-wood of oak, pine, and other structural timbers is not intrinsically stronger than the sap-wood, as has often been supposed to be the case; nor is the sap-wood of hickory and ash intrinsically stronger than the heart-wood, as is sometimes claimed in connection with handle stock.

The essential differences between heart-wood and sap-wood are as follows:

Heart-wood, as a rule, is more durable than sap-wood in damp locations, and less subject to attack by stain and mold-producing fungi. Usually it is colored, and therefore considered more ornamental than the white sap-wood, except in a few cases; in yellow pine interior finish and maple flooring, for example, the white sap-wood is preferred. Heart-wood is less permeable to liquid, and therefore more suitable for tight cooperage, tanks, and conduits; and it responds more slowly to changes in atmospheric humidity, which often is of advantage when uncoated wood is exposed for a relatively short time to a different humidity. The heart-wood of some species contains more valuable extractable materials, such as tannin and dyes, than does the sap-wood.

Sap-wood, as a rule, takes preservative treatment better than heart-wood. It seasons faster, but when green usually contains a larger percentage of moisture, which often makes it heavier. Because sap-wood is the outer portion of the tree, it contains fewer common defects, such as knots, shakes, and pitch streaks. In resinous species the sap-wood usually contains less resin than the heart-wood. Sap-wood is more free from odor and taste, which may be an advantage in some cases and a disadvantage in other cases.

## Announcements

Leonard Anthony Gliatto, architect, announces the removal of his office, April 1, 1924, to 343 South Dearborn Street, Chicago.

Annette Hoyt Flanders, member of the American Society of Landscape Architects, announces the opening of her office for the practice of landscape architecture, 8 West 51st Street, New York. Helen Swift Jones, associate.

M. Margolin, registered architect, announces his removal from 1384 St. Marks Avenue to 383 Jay Street, Brooklyn, Home Title Building, New York City. Manufacturers' catalogues and samples are requested.

Heacock & Hokanson announce the removal of their offices to 1211 Chestnut Street, Philadelphia.

A. Lincoln Fechheimer, architect, wishes to announce the admission to partnership of Mr. Benjamin Ihorst and Mr. Percy L. McCoy. The firm will hereinafter practise under the name of Fechheimer, Ihorst & McCoy, at 1010–1014 Schmidt Building, Cincinnati, Ohio.

Ferruccio Vitale, A. F. Brinckerhoff, Alfred Geiffert, Jr., landscape architects, and Walter Bradnee Kirby, architect, wish to announce the dissolution of their partnership and the removal of their offices to 101 Park Avenue, New York, where in association they will continue their practice.

W. H. Spaulding, architect, Jamaica, New York, announces the removal of his offices from 375 Fulton Street to 163 18 Jamaica Avenue.

H. Van Buren Magonigle, architect, 101 Park Avenue, New York, designer of the great Kansas City Memorial, has been elected an associate of the National Academy of Design. Mr. Magonigle has always been noted for his fine draftsmanship and his paintings in both water-color and oil have been shown in many exhibitions.

## Mr. Platt to Design the National Gallery of Art at Washington

MR. CHARLES A. PLATT, whose beautiful Freer Gallery has already made his name more widely known to all visitors to the national capital, has been selected as the architect of the much-needed new National Gallery. The present space in the Smithsonian Institution has long since become inadequate, and it is high time that the splendid collection assembled there should have a suitable place for exhibition.

According to Mr. Platt's conception the gallery should accord with the best architectural traditions of beauty rather than with modern standards of practicability and efficiency.

His conception of the proposed National Gallery Building so far developed—it is merely a preliminary conception—looks to the erection of a building containing first and second floors and a basement, with the main galleries for the exhibition of paintings on the second floor, where a light from overhead may be obtained. Granite, the most permanent stone, probably will be used in the construction of the exterior, in harmony with the building material used in the Freer Gallery, also designed by Mr. Platt, and also in the Natural History Building and the new buildings of the Smithsonian group.

Mr. Platt believes that the correct layout for the gallery should lead the visitors on from object to object and from floor to floor without giving them the impression they are climbing the Alps, for example. Though he plans to take into consideration everything that makes for a beautiful building, he will bear in mind, he said, the necessity of creating a structure that shall present to the people, to their best advantage, the art treasures donated to the government in the past and which may be acquired in the future.

The site available includes a space about 580 feet long by 320 wide.

## Life-and-Death Struggle Between Squirrel and Forest

IN many of the Western yellow pine forests in the Northwest the pine-squirrel and the second-growth pine may be said to be engaged in a struggle to the death, with the squirrel holding a conspicuous advantage, according to latest reports, says the Forest Service, United States Department of Agriculture. The squirrel's advantage is due to the fact that, somewhat like the early bird, he is busily collecting the seed before it has a chance to "dig itself in" and develop into a pine seedling. In examining some fifteen-year-old cuttings in Montana, the Priest River Forest Experiment Station found that practically no new growth has come in. Cones are plentiful on the two or three seed trees an acre left for seeding new growth and show sufficient seed to start up at least an open stand in fifteen or twenty years against all other enemies of young trees; but there is evidence that the pine-squirrel is determining otherwise, and that possibly nothing short of planting such areas with seedlings will circumvent the sharp eyes and insatiable appetite of this small foe.

## Timber-Cutting in California

THE best methods of harvesting national forest timber in the Sierra forests of California is the subject of Department Bulletin No. 1176, issued by the United States Department of Agriculture, entitled "Some Results of Cutting in the Sierra Forests of California."

As in other forms of agriculture, the best soils and most favorable climates result in the most rapid growth, and the poorer the soils and the more unfavorable the other growing conditions, the poorer response the trees make. Especially is this so after the removal of the older trees, for the seed trees left do not grow as rapidly, new growth takes longer to become established, and the length of time required to produce a new crop for harvesting is prolonged.

In the California pine forests, new seedlings become established in about five years under good growing conditions, while on the poorer lands as high as twenty years may be required before the area is again stocked and it is quite possible that the distribution of the seedlings will not be uniform, according to the bulletin. When the forest is logged as many of the young trees on the ground should be saved from destruction as is possible, as this advance growth saves time in waiting for new seedlings and usually grows very rapidly after the older forest has been removed.

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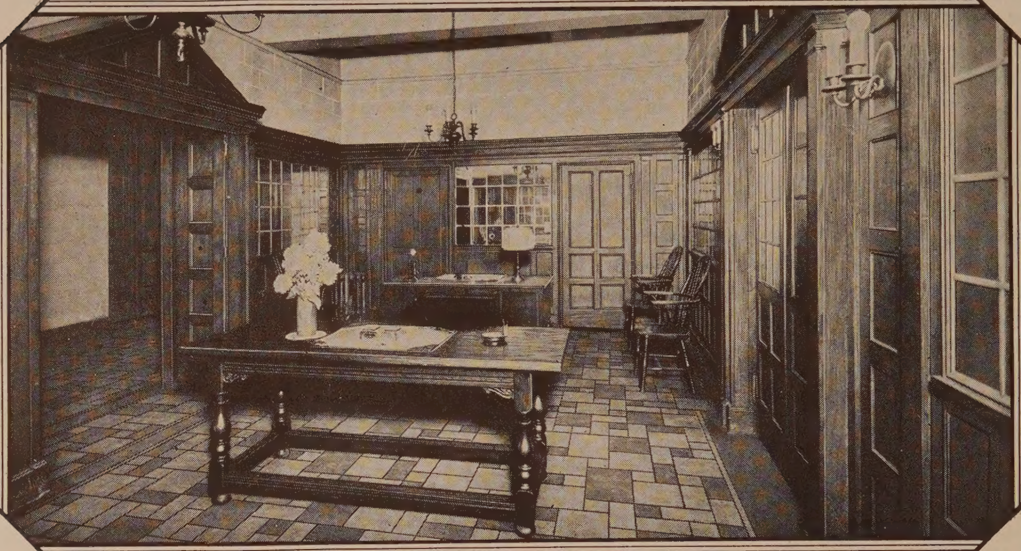

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